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UPGRADING AND EXPANSION OF THE WSSC PISCATAWAY WASTEWATER TREATMENT FACILITY TO 30 MGD AWT, PRINCE GEORGE'S COUNTY, MARYLAND

Environmental Protection Agency
Philadelphia, Pennsylvania

16 September 1974

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FINAL ENVIRONMENTAL IMPACT STATEMENT
UPGRADING AND EXPANSION
OF THE
WSSC PISCATAWAY WASTEWATER TREATMENT FACILITY
TO
30 MGD AWT

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10	Piscataway Bay	
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LIST OF ABBREVIATIONS

EPA	United States Environmental Protection Agency
CEQ	Council on Environmental Quality
NEPA	National Environmental Policy Act of 1969 (P.L. 91-190)
WSSC	Washington Suburban Sanitary Commission
MES	Maryland Environmental Service
SMSA	Standard Metropolitan Statistical Area
MGD	Million Gallons Per Day (average daily flow unless otherwise indicated)
AWT	Advanced Wastewater Treatment
SS	Suspended Solids
BOD_5	Five day Bio-chemical Oxygen Demand
P	Phosphorous
N	Nitrogen
cfs	Cubic Feet Per Second
mg/l	Milligrams Per Liter (1/1000 grams per liter)
ug/l	Micrograms Per Liter (1/1,000,000 grams per liter)
DBH	Diameter Breast Height

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SUMMARY SHEET FOR

ENVIRONMENTAL IMPACT STATEMENT

Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 mgd AWT.

( ) Draft
(X) Final

U.S. Environmental Protection Agency

Region III

Philadelphia, Pennsylvania

1. Name of Action

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2. Description

The Washington Suburban Sanitary Commission (WSSC), under the authority of P.L. 92-500, the Federal Water Pollution Control Act Amendments of 1972, has applied to the Environmental Protection Agency (EPA) for federal financial assistance to upgrade the WSSC Piscataway Wastewater Treatment Facility to provide advanced wastewater treatment (AWT) and to operate at its full 30 million gallons per day (mgd) capacity.

The WSSC proposes to install AWT additions which would remove up to 96% of BOD_5 and phosphorus and 85% of nitrogen from the sewage, converting the secondary effluent from the existing 30 mgd wastewater treatment facility to a high quality AWT effluent.

The WSSC also proposes to install approximately 18,000 feet of 108-inch diameter effluent discharge pipe which would change the effluent discharge point from its present location in the upper reaches of Piscataway Bay to the main channel of the Potomac Estuary. Because the assimilative capacity of Piscataway Bay is severely limited, the Potomac River Enforcement Conference restricted the existing Piscataway 30 mgd secondary treatment facility to a discharge of 15 mgd. (EPA Region III has conditionally approved an increase of this temporary discharge limit to 20 mgd to permit treatment of untreated or inadequately-treated discharges which otherwise would occur upstream.) The discharge pipe to the Potomac Estuary, in combination with the AWT capability, would end the need for this restriction and allow utilization of the Piscataway facility at its full 30 mgd capacity.

Pursuant to P.L. 91-190, the National Environmental Policy Act of 1969, and Executive Order 11514 "Protection and Enhancement of Environmental Quality", EPA Region III, on February 5, 1974, circulated for public comment, a Draft Environmental Impact Statement (EIS) on the proposed project; and on March 7, 1974, held a Public Hearing on the Draft EIS. EPA has carefully reviewed all the testimony and comments received and considered their content in revisions to the Draft EIS, here presented as the Final EIS.

3. Environmental Impacts

The Final EIS indicates that the proposed project is an integral part of a comprehensive program, developed by the Potomac River Enforcement Conference, to clean up the Lower Potomac and its tributaries. The proposed project, by itself, would improve water quality in the tributaries to Piscataway Bay, and to a lesser extent, in the Bay and the Potomac Estuary. The implementation of the proposed project, in conjunction with the other portions of the wastewater management planning for the Washington D.C. Metropolitan Area, will fulfill the goals of the Enforcement Conference without significantly sacrificing other environmental criteria, and will help provide a cleaner, healthier environment for those who live, work and visit in our Nation's Capital. The proposal is consistent with EPA policies of consolidating the wastewater treatment capacities while utilizing existing facilities where feasible.

It is recognized that this proposal could not be implemented without adverse environmental impacts. The EIS process has shown that these adverse impacts are largely short-term and within acceptable limits, resulting in reasonable trade-offs for the anticipated benefits which would be derived from the proposed action. These minor, short-term, adverse impacts are primarily associated with construction activities and would result in temporary increased noise levels, disruption of traffic, inconveniences to residents, siltation of streams, disruption to wildlife and wildlife habitat, and slight decreases in ambient air quality in areas proximate to construction. However, these impacts would be minimized through sound conservation practices and contemporary construction techniques.

The EIS process has revealed two major problems which have generated significant amounts of controversy: the construction of the effluent disposal pipe and the proposed method of sludge treatment and disposal.

The proposed 108-inch effluent discharge pipe is controversial because it could potentially accommodate, by gravity, a flow of 152.5 mgd, more than five times the present requirement. However, EPA concludes that it is economically sound and environmentally acceptable to install this excess capacity at this time. Current water quality planning calls for the future expansion of the Piscataway Facility, and these County and State plans are feasible with regard to water quality objectives. Thus there is a prima facie probability that at least a portion of the excess capacity will be needed at some future date. To build a smaller capacity pipe now and add capacity later would require double construction, greatly increasing the costs and repeating the construction-related temporary environmental damage and disruption to Piscataway Park. However, it should be emphasized that EPA is only endorsing use of the proposed discharge line for 30 mgd, and that this action does not, in any manner, "lock in" or obligate EPA to sponsor or approve contemplated additions to the Piscataway facility. Each grant application for the construction of wastewater treatment facilities must be reviewed by several governmental agencies to ensure compatability with regional development. In addition, the FWPCA Amendments of 1972 requires a National Pollutant Discharge Elimination System Permit for each increase in effluent levels accompanying future wastewater treatment expansions. Therefore, if expansion of the Piscataway facility is proposed, EPA will again conduct an Environmental Review and it will be EPA's policy not to preclude any alternatives due to the existence of the 108-inch effluent line. As insurance against possible future disruption of the Park, the modest added cost of building the larger line now could still be considered a sound investment.

Concerning sludge treatment and disposal, the EIS indicates that WSSC proposed to incinerate the AWT sludge in the recently completed Piscataway sludge incinerators, and that an intensive incinerator testing program is proposed by WSSC, the University of Maryland, and EPA in order to determine the efficiencies of the incinerators and of their emission control equipment. With the advent of the fuel shortage, EPA in the Draft EIS requested WSSC to develop a contingency plan for sludge treatment and disposal, which would be implemented in the event fuel (#2 fuel oil) became unavailable. During the review period of the Draft EIS, public objection to the operation of the incinerators surfaced, based on a fear that the operation of the incinerators would endanger public health. EPA then requested WSSC to expand its contingency plan to provide alternatives for sludge treatment and disposal while the incinerators were being tested and which would be adopted permanently if testing showed the incinerators to offer a hazard to public health. The contingency plan presently calls for the raw AWT sludge to be stabilized and applied to land as a soil conditioner or for soil enrichment. The Final EIS shows that preliminary incinerator tests by EPA indicate that no danger to the public health would result from the incinerators for testing purposes. However, EPA will not allow the Piscataway incinerators to operate on a routine basis unless it is further assured that public health would not be endangered. At the completion of the incinerator testing program, the test data will be analyzed and evaluated, and a decision will be made as to the method of sludge treatment and disposal which will be pursued at the Piscataway 30 mgd AWT facility. All of this information will be presented in a Supplement to this Final EIS. This approach will permit the construction of the AWT additions and the effluent discharge pipe portions of the proposed project to continue without unnecessary delays while deferring the decision on sludge treatment and disposal until all the pertinent data are available and the best course of action can be determined.

4. Alternatives.

Numerous alternatives have been evaluated based on environmental and economic considerations. Alternative evaluations vary from unit treatment processes to land treatment to no action. In addition, these individual alternatives have been evaluated in combinations of feasible alternative systems.

5. Information used in the EIS has been solicited from Federal, State and local agencies, local organizations and the public. The following pages contain a list of those agencies, organizations and citizens from whom comments on the Draft EIS or requests for the Final EIS have been received.

6. The Draft EIS was made available to the President's Council on Environmental Quality (CEQ) and the public on February 5, 1974. This Final EIS will be made available to CEQ and the public in October, 1974.

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INTRODUCTION

On October 18, 1972, the Federal Water Pollution Control Act Amendments (FWPCA of 1972) became Public Law 92-500.* This new law created a program based on three major elements: uniform nation-wide standards, enforceable regulations, and a permit program based on effluent limits and geared to specific goals. Under the statutory authority of P.L. 92-500, the Environmental Protection Agency (EPA) is charged with administering these programs.

The primary aim of the Act is to "restore and maintain the chemical, physical and biological integrity of the Nation's waters." By July 1983, wherever possible, water quality is to be suitable for recreational contact and for protection and propagation of fish and wildlife. To achieve these objectives, the Act establishes a national goal that discharges of pollutants be eliminated by 1985. However, the Act does not make the 1985 goal a legally binding requirement. In addition, the Act emphasizes the special need for controlling or eliminating discharges of toxic pollutants.

These national goals are to be implemented by two programs. The first is an expanded system of Federal grants to plan and construct publicly owned wastewater treatment facilities. Second, a permit program has been established to restrict pollutant discharges from point sources--i.e., from factories, municipalities and large agricultural operations where pollutants enter the Nation's waters through an outfall pipe, sewer or other conduit.

The law created a new system to limit discharges of all pollutants from point sources. These minimum limits are set in two steps by EPA based upon the availability of proven pollution control technology. Different limitations apply to municipal treatment plants and industries, and both are required to meet increasingly stringent limitations by the 1977 and 1983 deadlines set in the Act. EPA also sets National Standards of Performance to limit effluents from newly constructed facilities, sets pretreatment standards to be used by industries that discharge their wastes into municipal treatment plants, and sets toxic effluent standards for sources that discharge toxic pollutants.

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*The following statement is drawn from "A Citizen's Guide to Clean Water," prepared by the Izaak Walton League of America under contract with the U. S. Environmental Protection Agency. Copies of this 94 page report can be obtained from EPA, Region III, upon request.

The water quality standards includes intrastate standards, as well as those for interstate waters. Existing standards are being revised to tie in closely with the major goals and deadlines in the Act. All water quality standards provide a yardstick to measure the effectiveness of effluent limitations. Where limitations are inadequate to protect high quality bodies of water, EPA prescribes more stringent limitations.

Standards under the Act represent goals to be achieved and maintained. The main mechanisms for meeting these standards are the permit program and the Act's planning processes.

The National Pollutant Discharge Elimination System (NPDES) is the major mechanism to regulate discharges from point sources. All such sources must obtain a permit from EPA or a Federally approved State program. These permits contain compliance schedules requiring the source to reduce pollutants step-by-step over a specified period of time. Sources also must monitor and report their discharges on a continuing basis.

One of the major systems of planning (the others being area-wide, state, and regional) mandated under the Act to clarify Federal, state and local roles in planning and management is municipal planning performed by individual municipalities or groups of municipalities. This local municipal planning is directly related to the building of publicly owned treatment works. Municipal facilities plans must provide ways to prevent, dispose and store wastes and must consider alternatives other than conventional structural facilities to reduce municipal wastes.

The FWPCA Amendments of 1972, also provides that Federal grants, given to plan and construct publicly owned wastewater treatment facilities, and NPDES permits for new sources (as defined in Section 306 of the Act), be subject to compliance with P. L. 91-190, the National Environmental Policy Act (NEPA) of 1969, and Executive Order 11514 entitled "Protection and Enhancement of Environmental Quality" dated March 5, 1970. Both NEPA and Executive Order 11514 require that all Federal Agencies prepare Environmental Impact Statements in connection with their proposals for major Federal actions significantly affecting the quality of the human environment. Consequently, EPA, Region III, on February 5, 1974, circulated for public comment, a Draft EIS on the upgrading and expansion of the Piscataway Wastewater Treatment Facility to 30 mgd AWT, as proposed by the Washington Suburban Sanitary Commission (WSSC). All the comments received were reviewed, evaluated, used, and addressed in this Final EIS.

The EIS was prepared in accordance with the regulations and guidance set forth in the President's Council on Environmental Quality (CEQ) Guidelines dated August 1, 1973, and EPA's Interim Regulations, CFR 40-Part 6, dated January 17, 1973, both concerning the preparation of Environmental Impact Statements.

The Draft EIS was limited to the WSSC proposal which consisted of upgrading the existing Piscataway 30 mgd secondary wastewater treatment facility to 30 mgd AWT, and for the construction of an effluent discharge pipe to the Potomac Estuary which would permit the Piscataway facility to operate at its full 30 mgd capacity (due to water quality limitations in Piscataway Bay, the Piscataway facility is currently limited to a 17 mgd effluent discharge). Because sludge incineration capacity already existed at the Piscataway facility, no alternatives for sludge treatment and disposal were considered in the Draft EIS.

Public comment and testimony on the Draft EIS raised a number of issues and concerns associated with the proposed action. The most salient of these issues surrounded the mode of sludge treatment and disposal and the scope of the EIS (limited to 30 mgd).

EPA has stated, in both the Draft and Final EIS, that the proposed project is limited to 30 mgd AWT at Piscataway, that action on the proposed project does not, in any manner, obligate or preclude future decisions concerning expansion at Piscataway, and that any future expansion at Piscataway will be subject to a NEPA Review (if Federal funds are involved) and to the NPDES permit process.

Due to the public comments and concerns, in addition to the requirements for natural resources, EPA requested WSSC to evaluate alternative methods for sludge treatment and disposal, complete the proposed testing program for the Piscataway incinerators, and develop a contingency plan for sludge treatment and disposal. Because WSSC has been unable to complete the incinerator testing program as originally planned, EPA has elected to defer its decision as to which method of sludge treatment and disposal should be pursued at Piscataway (for the 30 mgd AWT sludge) until the incinerator testing program has been completed. The Final EIS is being issued at this time in order that administrative action can proceed on the AWT additions and construction of the effluent discharge pipe to avoid possible construction delays and increased costs. Administrative action concerning sludge treatment and disposal will not be taken until the incinerator testing program is completed and a Supplement to this Final EIS containing all test results and evaluations is issued. This

EIS does not dictate the ultimate solution to water quality management for the area. Pollution abatement is a continuous endeavor where Federal, State, County, and local governments all have responsibilities to achieve and maintain the water quality goals mandated by Federal and State laws.

The EIS evaluates the impact of the proposed project on the environment in terms of both the positive and negative effects of the proposed action. The analysis includes both the primary (direct) consequences for the environment and the secondary (indirect) consequences.

In accordance with the Council on Environmental Quality Guidelines, this EIS presents the population and growth assumptions used to support the project and to determine secondary population and growth impacts resulting from the proposed action and its alternatives. This EIS also examines the relationship of the proposed action to land use plans, policies and controls of the affected area, and how the proposed project may conform or conflict with the objectives of approved or proposed Federal, State, and local land use plans, policies, and controls. This statement describes the extent to which EPA has reconciled its proposed action with these plans, policies or controls.

To insure that the public is kept fully informed regarding this action, and that it participates to the fullest extent possible in the Agency's decision making process, this EIS is being circulated for a 30-day review as required by the CEQ August 1 Guidelines. For the purposes of this Environmental Impact Statement, EPA, Region III, Philadelphia, Pennsylvania, is the "Responsible Federal Agency" as required by NEPA.

Note: Throughout the EIS, wastewater flows are referred to as average daily flows unless otherwise indicated.

I. BACKGROUND

I.A. LOCATION AND IDENTIFICATION OF STUDY AREAS.

Area limits have been chosen for the purpose of discussions and clarity throughout this Environmental Impact Statement, and various sections of the EIS will be addressed in reference to one or more of these defined areas.

The area limits are as follows:

1. Middle Atlantic Region.

Figure 1 outlines the general boundaries of this Region and indicates the location of the proposed upgrading and expansion of the Washington Suburban Sanitary Commission (WSSC) Piscataway Wastewater Treatment Facility in relation to the entire Middle Atlantic Region.

2. Washington, D.C. - Maryland - Virginia Standard Metropolitan Statistical Area (SMSA).

Figure 2 depicts the Washington, D.C. SMSA and the relative location of the Piscataway Wastewater Treatment Facility. As Figure 2 indicates, the Washington, D.C. SMSA is composed of: Montgomery, Prince George's and Charles Counties, Maryland; The District of Columbia; Loudoun, Prince William, Fairfax, and Arlington Counties, Virginia; and the cities of Alexandria, Fairfax, and Falls Church, Virginia.

3. Potentially Serviceable Area.

Figure 3 outlines the general boundaries of the Potentially Serviceable Area for the ultimate capacity of the Piscataway Wastewater Treatment Facility. This area is essentially the Design Service Area (see below) plus that area which could logically be serviced, or is planned to be serviced at a later date, by the Piscataway Wastewater Treatment Facility. This additional area is presently planned to consist of the portion of the Anacostia River Basin which lies outside the Washington, D.C. boundaries.

4. Design Service Area (30 million gallons per day (mgd) Advanced Wastewater Treatment).

Figure 3 outlines the boundaries of the Design Service area for the Piscataway Wastewater Treatment Facility which consists of Piscataway and Henson Creeks Drainage Basins. The proposed project is designed to provide sewer service to this area until the late 1970's at which time the Piscataway Facility may be expanded in order to service the entire Potentially Serviceable Area.

I.B. DESCRIPTION OF THE EXISTING PISCATAWAY WASTEWATER TREATMENT FACILITIES.

Figure 4 is a site plan for the existing and proposed wastewater treatment facilities at Piscataway. Also shown in Figure 4 are the locations of the Photographs (Section IV.G.) which were taken of the main portions of the facility; these should be referred to throughout this discussion.

In October of 1964, a Federal grant in the amount of $600,000 was awarded to the Washington Suburban Sanitary Commission to aid in the construction of a 5 mgd activated sludge wastewater treatment facility which would provide secondary treatment for wastewaters generated along Piscataway Creek, in the Swan Creek Sub-Basin, and along the North Shore of Piscataway Bay. Construction was completed in April of 1969. The effluent from this plant was discharged into a nearby stream which was tributary to the swamp along the edge of Piscataway Creek (Photo No. 8). Solids processing consisted of thickening, digestion, vacuum filtration, and disposal of the residue to a landfill.

A second grant project provided for a 5.0 mgd model advanced wastewater treatment plant (Photo No. 2) which was designed to demonstrate the technical and economic feasibility of removing additional pollutants from conventionally treated secondary effluents. This project was funded under the Research and Demonstration Grant Program rather than as a construction grant and was awarded in December of 1966 ($1,650,000) and June of 1969 ($750,000).

The model AWT plant was designed to treat the effluent from the original 5.0 mgd Piscataway secondary treatment facility and utilizes three unit processes. The first of these consists of two stage lime addition with intermediate recarbination for phosphorus and suspended solids removal. The effluent from this process is then subjected to dual media gravity filtration for removal of turbidity caused by various precipitated compounds and fine organic solids. After a pH adjustment, the final process-activated carbon absorption - is applied to the wastewater stream for removal of dissolved organic material. The effluent is then discharged to the polishing ponds which are described below. Both the lime and the activated carbon are thermally regenerated and recycled for reuse. The model AWT plant has been in operation since November of 1972.

A third Federal grant (WPC-Md.-233) was designed to provide partial funding for an additional 25 mgd of secondary capacity at Piscataway. A grant in the amount of $1,100,000 was made in March of 1970. This grant has been increased several times as funds became available and the scope of the project was expanded to include cost overruns of the 5.0 mgd model advanced wastewater treatment (AWT) plant. The most recent increase was made in August of 1972 and it raised the grant amount to $3,562,860 or approximately 29 percent of the estimated eligible project cost. The project appears to be eligible for an increase in funding up to the 55 percent level under the reimbursable provisions of P.L. 92-500. However, none of these funds have been paid the applicant as of this date since one condition of the original grant stipulated no payment would be made until the applicant has submitted acceptable plans and specifications for a facility capable of meeting the removal efficiencies specified by the Potomac River Enforcement Conference (discussed later).

While WPC-Md-233 provided for additional primary clarifiers (Photo No. 6), aeration basins, and secondary clarifiers, the project also included the construction of two polishing ponds (Photo No. 7) with a combined capacity of 77.3 mgd. The plant effluent is discharged into these polishing ponds and after three days (at design flow) it is chlorinated and discharged directly to Piscataway Creek (Photo No. 8). The solids handling process was designed to consist of thickening, dewatering, and incineration in three fluidized bed sludge incinerators (Photo No. 3) (a schematic of the fluidized bed incineration process is shown in Figure 22 and discussed in more detail in Appendix A). Until construction of the incinerators was completed, the sludge was anaerobically digested and transported a short distance to the Bevard Farm where it was used, along with the sludge generated from two other major WSSC wastewater treatment facilities, for soil enrichment at a rate of approximately 50 dry tons/acre.

Due to the temporary restriction on the operation of the incinerators (discussed below) the interim contingency plan for sludge treatment and disposal calls for a continuation of the stabilization of raw sludge by anaerobic/aerobic digestion with land spreading at the Bevard Farm (discussed in more detail in Section IV.A.1.c.).

As a result of continued algae blooms occurring in the lower portion of Piscataway Bay, (apparently as a result of wastewater discharges), the Potomac River Enforcement Conference recommendations of June 1972, directed WSSC to provide 30 mgd AWT facilities to companion the full 30 mgd secondary treatment facility which was nearing completion at that time. In addition, the Enforcement Conference determined that the assimilative capacity of Piscataway Bay was limited to 15 mgd of AWT effluent, therefore requiring a new effluent discharge site into the Potomac Estuary. However, until the AWT facilities became operational, the Enforcement Conference permitted the Piscataway facility to discharge 15 mgd of secondary treated effluent into the Bay. In August, 1973, due to continued water quality degradation resulting from upstream discharges of insufficiently or untreated sewage, the State of Maryland requested EPA to approve an increase in the temporary allowable discharge to 20 mgd. In response, the Regional Administrator of EPA, Region III provisionally approved an increase to 17 mgd secondary effluent provided that the results of a surveillance program, being conducted in Piscataway Bay, indicated that no reduction in existing water quality levels would occur. Recent results of these studies have shown that water quality levels have not been reduced and that the temporary allowable discharge could be increased to 20 mgd, however, discharges of greater than 20 mgd could result in reduced water quality.[1]

Wapora, Inc. reports in their Environmental Impact Assessment for the Advanced Waste Treatment Addition - WSSC Piscataway Plant-Prince George's County Maryland that the facilities described above have been supplemented by interim chemical feed equipment which is used to add alum to the wastewater stream. This fact appears to account for the low concentration of phosphorus reported in the performance summary which follows.

TABLE 1

PISCATAWAY WASTEWATER TREATMENT FACILITY PERFORMANCE*

Parameters	Present Conc. (mg/1)	Total Load (1b/day)
BOD_5	4.5	585
SS	3.0	390
Total PO_x-P	1.02	133
Total N	12.34	1,604
DO	9.07	1,178

*Average effluent quality and discharge of 15.6 MGD for the period of January - April 1974

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[1] Copies of pertinent correspondence is contained in Appendix K.

During a recently conducted joint Federal-State operations and maintenance inspection, plant staffing was found to be as follows:

Superintendent	1
Operators	18
Laboratory Personnel	3
Maintenance	2
Other	4
Total	28

Wastewater is conveyed to the Piscataway Wastewater Treatment Facility by a system of gravity sewers which range up to 42 inches in diameter and flow generally along Piscataway and Tinker's Creeks. The plant also treats flows pumped from the Broad Creek, Henson Creek Basin and the Swan Cove Area. This flow is delivered to the plant in a 36-inch diameter force main. Figure 5, taken from the "Prince George's County Ten Year Water and Sewage Plan and Six Year Capital Improvements Program of the Washington Suburban Sanitary Commission", depicts the existing and proposed facilities in the Piscataway drainage area.

Status of the Piscataway Incinerators

Construction of the Piscataway incinerators was completed in mid-January, 1974, at which time they were operated intermittently for the purposes of adjustment and to obtain a "steady state" condition (representative of normal operation), in order that an intensive testing program by Batelle Columbus Institute, the University of Maryland, and EPA could be initiated. The incinerators were operated on this limited bases from mid-January to about mid-March, however, total operating time amounted to only 73 hours.

On March 26, 1974, the Prince George's County Council directed the County Health Officer to undertake steps to determine the cause of elevated blood lead levels which were reported in two children (residing near the Piscataway Wastewater Treatment Facility) in tests taken on March 14, 1974.

Although there was no evidence to establish a relationship between the incinerators (which had only been operated a total of 73 hours over a three month period) and the blood lead levels, EPA, Region III requested of WSSC, on March 26, 1974 (Appendix K) that further operation of the incinerators be halted until the results of the stack tests conducted by the EPA National Environmental Research Center, Research Triangle Park, North Carolina (RTP), and subsequent diffusion analyses were completed.

On April 18, 1974, the County Health Officer reported (Appendix K) to the P.G. County Council that of all the children tested (82) on April 8, 1974, none showed abnormal blood lead levels. In addition, the two children who had previously shown elevated blood lead levels had been rechecked and were found to be well within the normal range.

On April 30, 1974, EPA Region III notified WSSC (Appendix K) that preliminary results from the EPA RTP indicated that lead emissions from the incinerators were very low and did not constitute a public health hazard. Consequently, EPA rescinded the March 26, 1974, request to cease incinerator operation and suggested a comprehensive long-term testing program, which WSSC had planned, to more fully substantiate these results.

On May 28, 1974, the P.G. County Health Officer reported to the Prince George's County Council (Appendix K) that, although no final conclusions could be drawn, as far as could be determined, no one in the Piscataway area has elevated blood lead levels. In addition, Dr. Philip Landregan of the U.S. Public Health Service had stated that since the incinerator had only operated for 73 hours, its emissions cannot account for any important fraction of the lead presently in the blood of children living near it.

On May 28, 1974, the Prince George's County Council passed a Resolution (Appendix K) prohibiting the operation of the Piscataway incinerators until thirty (30) days after the Final EIS has been approved by the Council on Environmental Quality, until standards have been set for the hazardous pollutants from the incinerators, and it has been proved conclusively that these standards will not cause any health hazard to families in the Piscataway area.[1]

At the writing of this EIS, the Piscataway incinerators are not in operation.

It should be emphasized that it is the opinion of EPA that the reported elevated blood lead levels had no relationship with the intermittent operation (73 hours over three months) of the Piscataway incinerators and that EPA conclusively feels that no danger to public health would result from the operation of the Piscataway incinerators for testing purposes. In addition, EPA will not allow the operation of the incinerators on a routine basis if the results of the proposed tests indicate a possible danger to public health and is contrary to the test results previously discussed. Discussions on the preliminary test results and other data which support EPA's present position are detailed in Section IV and Appendix A-C.

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[1] Note: The authority of the Prince George's County Council to prohibit WSSC from operating the Piscataway incinerators is questionable; however, it is highly unlikely that WSSC would not honor a County resolution.

It should also be emphasized that the studies proposed by Batelle Columbus Institute cannot be done until after the incinerators have been operated to obtain "steady state" conditions, and that the studies by the University of Maryland must start two weeks prior to and at various intervals after the incinerators are started up. The scope and methodology of these studies are presented as an attachment to Appendix A.

I.C. BRIEF DESCRIPTION OF THE PROPOSED UPGRADING AND EXPANSION OF THE PISCATAWAY WASTEWATER TREATMENT FACILITY TO 30 MGD AWT.

The proposed upgrading and expansion of the Piscataway Wastewater Treatment Facility involves the installation of an advanced wastewater treatment (AWT) addition which would be designed to upgrade the secondary effluent from the existing 30 mgd treatment plant and convert it to high-quality AWT effluent. The proposed treatment process consists of biological nitrification-denitrification for nitrogen conversion and removal, chemical addition for phosphorous removal, gravity filtration for removal of suspended solids, and effluent reaeration for reintroduction of dissolved oxygen. The proposed AWT facilities, as depicted in Figure 4, would be located on land which is southwest of the existing secondary facilities and within the existing facilities' perimeter fence (Photo Nos. 4, 5, and 12).

The proposed action also includes the installation of approximately 18,000 feet of 108-inch diameter outfall pipe, the route of which is depicted in Figures 6 and 7. If installed, the outfall pipe would change the effluent discharge point from its present location in the headwaters of Piscataway Bay to a point located in the main channel of the Potomac Estuary approximately 2500 feet due west of Mockley Point.

I.D. PURPOSE FOR THE PROPOSED UPGRADING AND EXPANSION OF THE PISCATAWAY WASTEWATER TREATMENT FACILITY TO 30 MGD AWT.

The discussion below explains the purpose of the proposed action by placing it in a historical perspective as an outgrowth of the Potomac River Enforcement Conference. The purpose of the Enforcement Conference was effectively summarized when the Honorable Russell E. Train, speaking for the then Secretary of the Interior Walter J. Hickel, said, "Your task is to come up with a strong action program to clean up the Lower Potomac and its tributaries...".

The 1960's were years of explosive growth in the Washington Metropolitan Area. During that period the gap between metropolitan wastewater flows and available wastewater treatment capacity widened considerably. As a result, inadequately treated and untreated sewage was discharged into receiving waters and water quality in the Potomac River deteriorated. In April of 1969, the Potomac River Enforcement Conference (originally called in 1957) was reconvened as a result of this acute situation. After lengthy hearings, the Conference recommended that, among other things, "the planned advanced wastewater treatment plant at Piscataway be constructed as soon as possible".

As previously mentioned in Section I.B., a construction grant was awarded to the Washington Suburban Sanitary Commission for the construction of an additional 25 mgd of secondary treatment capacity on March 17, 1970. This event occurred slightly less than one year after the Enforcement Conference had made its initial recommendation. Since the construction of the model 5 mgd AWT research plant had not begun, it was not feasible to require nutrient removal facilities in the expansion project even though nutrient discharge limits requiring 96 percent BOD_5 and phosphorous removal and 85 percent nitrogen removal had been established for Piscataway Bay by the Enforcement Conference. On the other hand, since the existing 5 mgd secondary treatment facility (then in operation at Piscataway) was approaching its capacity, it was not feasible to defer action on WSSC's grant application until the model AWT plant's research results could point the way to the most efficient phosphorous removal process. A compromise solution was found and the construction grant was awarded for the secondary expansion but it was conditioned in such a manner that no funds would actually be disbursed until EPA Region III had approved final engineering plans and specifications for a facility capable of removing 96 percent of BOD_5 and phosphorous. In addition, an acceptable preliminary design for nitrogen removal facilities was required. This compromise solution enabled construction to proceed while the pilot plant carried on its research work.

In addition to developing an "action program" for cleaning up the Potomac River, the Enforcement Conference also sponsored comprehensive water quality studies of the Potomac which became the basis for many of its recommendations. One of these studies found that in order to protect Piscataway Bay from water quality degradation, the discharge of wastewater into the Bay should not exceed 15 mgd of AWT effluent. The Conference then moved to limit the flow at the Piscataway Wastewater Treatment Facility to 15 mgd with the provision that this amount could be increased only if AWT was provided and the effluent was discharged to the main channel of the Potomac. However, as was already stated in Section I.B., due to continued water degradation from the upstream discharge of insufficiently or untreated sewage, the Regional Administrator of EPA Region III has approved an increase in the temporary allowable discharge limit from the existing Piscataway facility to 20 mgd (Appendix K).

Therefore the purpose of the proposed action is to satisfy these stipulations and allow complete utilization of the 30 mgd secondary plant which was recently been constructed.

I.E. BRIEF DESCRIPTION OF EXISTING AND PROPOSED WASTEWATER TREATMENT FACILITIES IN THE WASHINGTON, D.C. SMSA.

A listing of all domestic and industrial wastewater dischargers in the Washington, D.C. SMSA and Virginia is provided in Appendix I, Tables 11, 12, and 13. In addition, Figure 8 shows all domestic wastewater treatment facilities in the Potentially Serviceable Area. The numbers in Figure 8 correspond to the numbers assigned to the dischargers listed in the above referenced Tables.

I.F. FUTURE PLANS FOR PISCATAWAY AND RELATED WASTEWATER TREATMENT FACILITIES.

Section I.C. and I.D. above contain a brief description of WSSC's proposal to provide capacity for 30 mgd advanced wastewater treatment at Piscataway and a 108-inch effluent pipe from the facility to the Potomac Estuary. While the present Environmental Impact Statement is limited to these proposals, Prince George's County, WSSC, and the Maryland Environmental Service (MES) have proposed several additional construction projects which, if carried out, would greatly increase the capacity and service area of the Piscataway Wastewater Treatment Facility. The following information is abstracted from two documents: "Prince George's County Ten Year Water and Sewerage Plan and Six Year Capital Improvements Program of the WSSC," and a draft of the State of Maryland's "Potomac-Metropolitan Area Basin Water Quality Management Plan", dated March 1974.

The purpose of identifying the Anacostia Drainage Basin, in Section I.A., as the logical addition to the Design Service Area for the Piscataway Facility, will now become clear. Figure 9 depicts the ten year wastewater treatment facilities planning in the bi-county area. The following is a brief description of the major features related to Piscataway:[1]

1. Anacostia Sewage Pumping Station and Force Main.

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[1] The reader's attention is invited to a report entitled "Lower Potomac Basin Wastewater Facilities Study:, Bechtel, Inc., November, 1972.

This increases the capacity of the existing Anacostia pumping station and force main to the Blue Plains Facility. Programmed for completion in approximately 1977, this combined facility will pump sewage from the Anacostia Basin in both Maryland counties to Blue plains.

2. Potomac Force Main.

This facility is designed to deliver sewage flows from the Anacostia Force Main at its Blue Plains terminus, to the Piscataway Facility. Flows from Anacostia in excess of the amount allocated under the 1970 Memorandum of Understanding (reproduced in Appendix G) will be treated at a future expanded Piscataway AWT Facility.

3. Piscataway Wastewater Treatment Facility.

Expansion beyond the presently proposed 30 mgd AWT will complete the system which will serve the Anacostia Basin and will relieve Blue Plains.[1] Prince George's County has approved a first stage expansion to 95 mgd which would be adequate until about 1991. MES recommends that this expansion be at least 80 mgd AWT, bringing the total capacity at Piscataway to 110 mgd AWT which would be adequate for a minimum of about 10 years (1993). At this time, if these and the related delivery projects are completed, most of the flows treated at the Piscataway facility will be from outside the Piscataway-Henson-Broad-Swan Creeks area. In order to accommodate all excess Blue Plains flows in the year 2000, it is anticipated that the Piscataway facility would require a capacity of approximately 155 mgd.

4. Other Sewer Construction.

A large number of relief and collector sewers are programmed for the Piscataway, Broad and Anacostia Basins. These are catalogued in the Prince George's County Ten Year Plan, which should be consulted for locational and capacity data.

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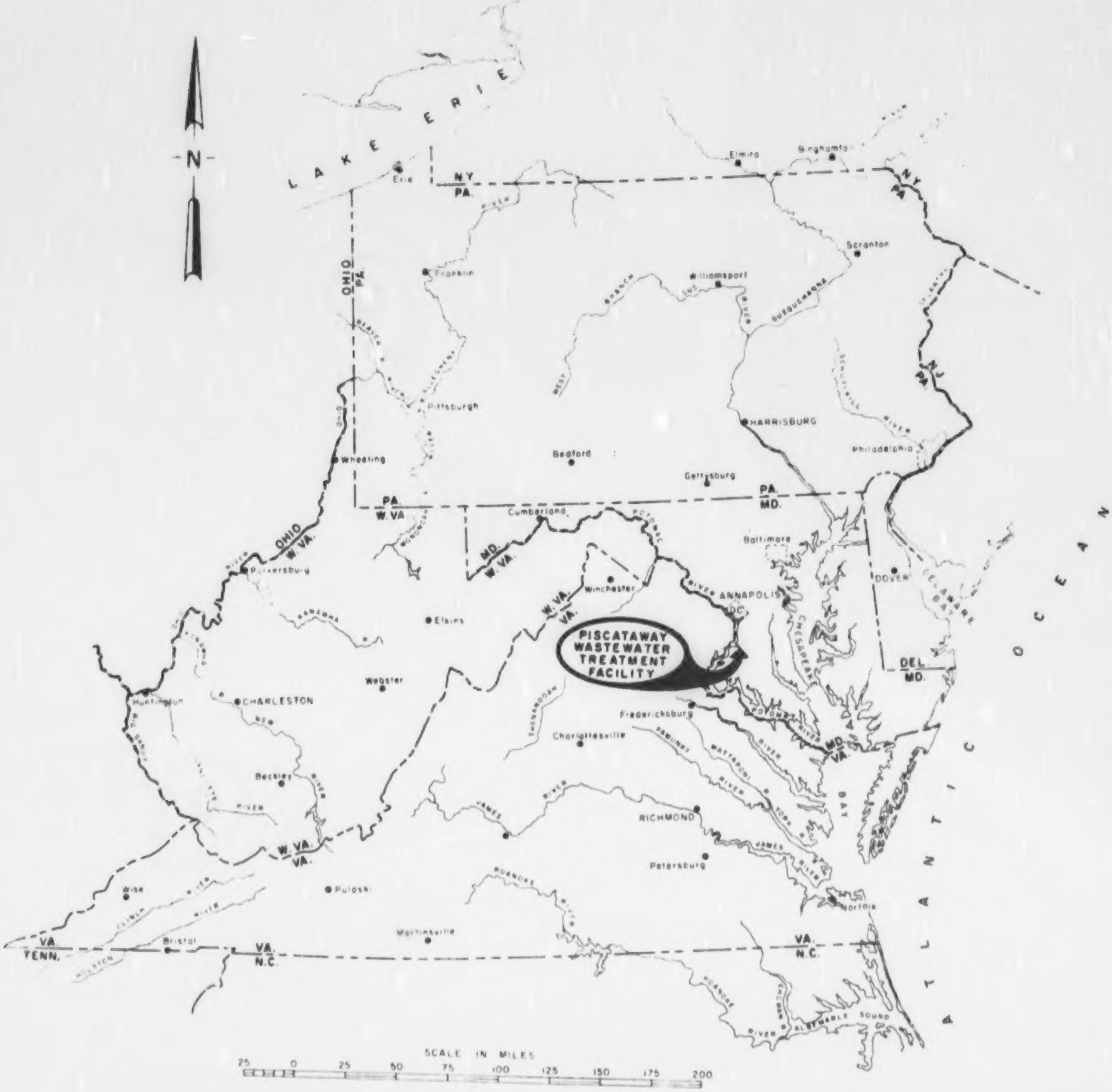
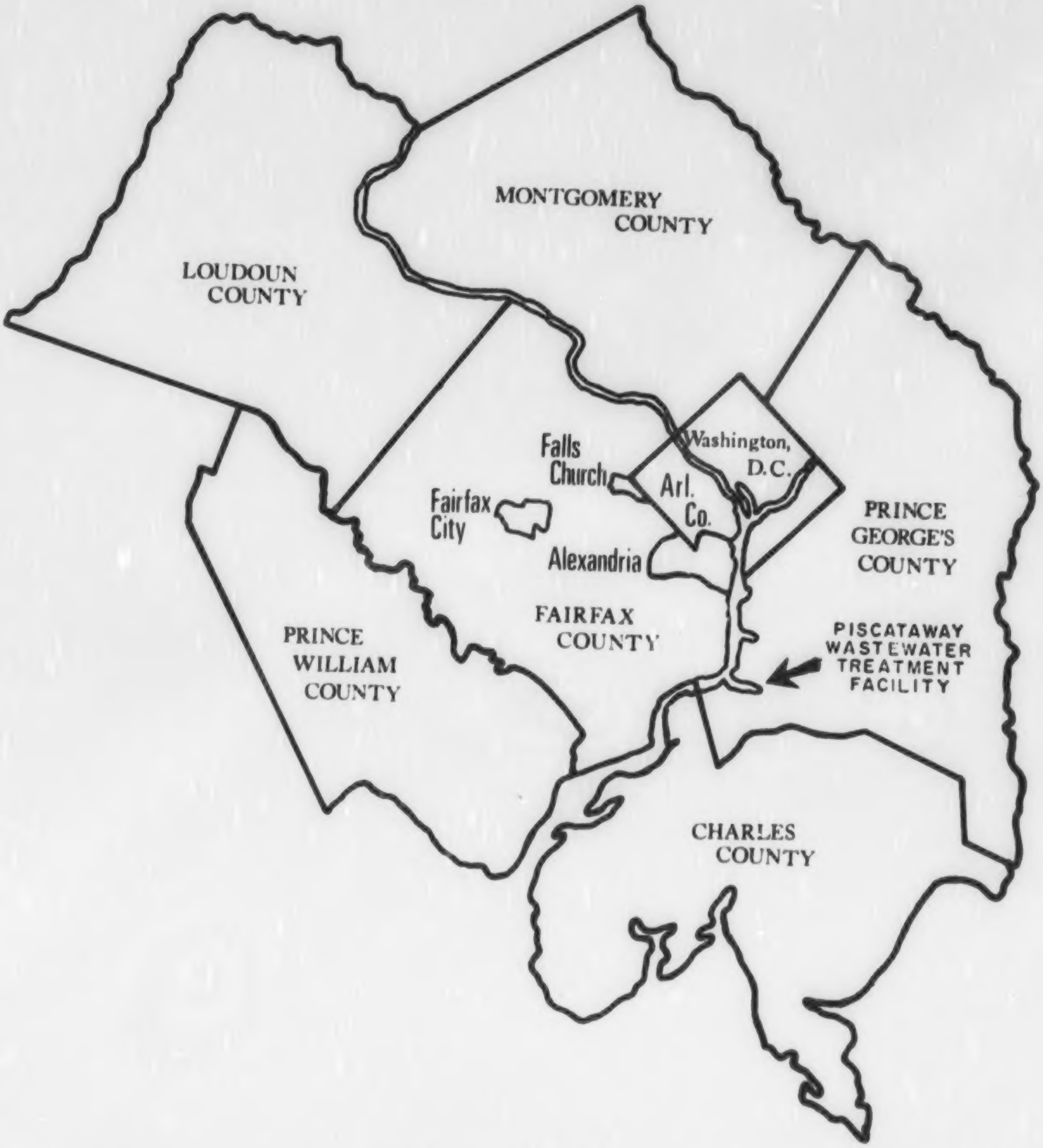
[1] Section II.H. should be referred to for a complete discussion on flow projections.



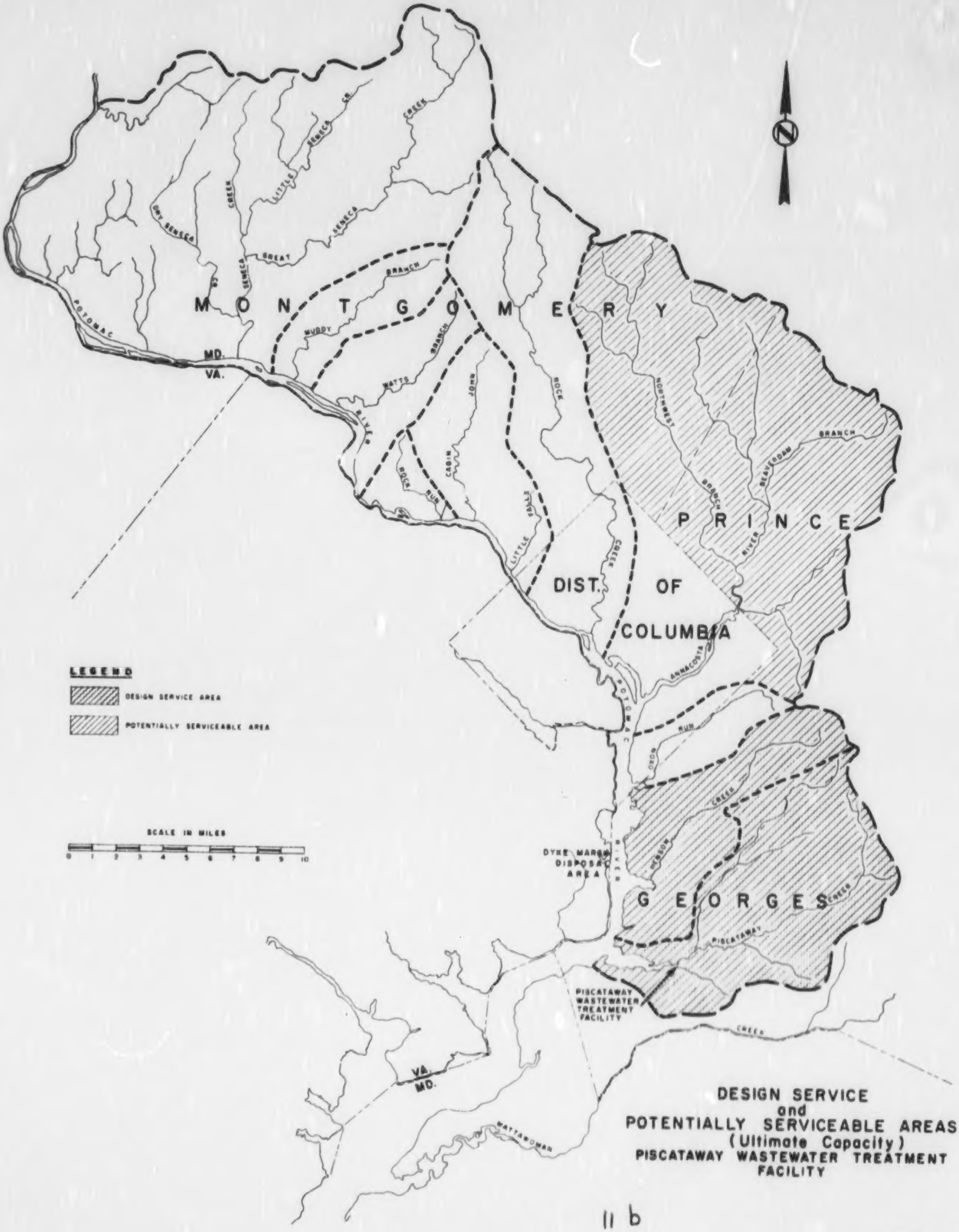
MIDDLE ATLANTIC REGION

FIGURE 1



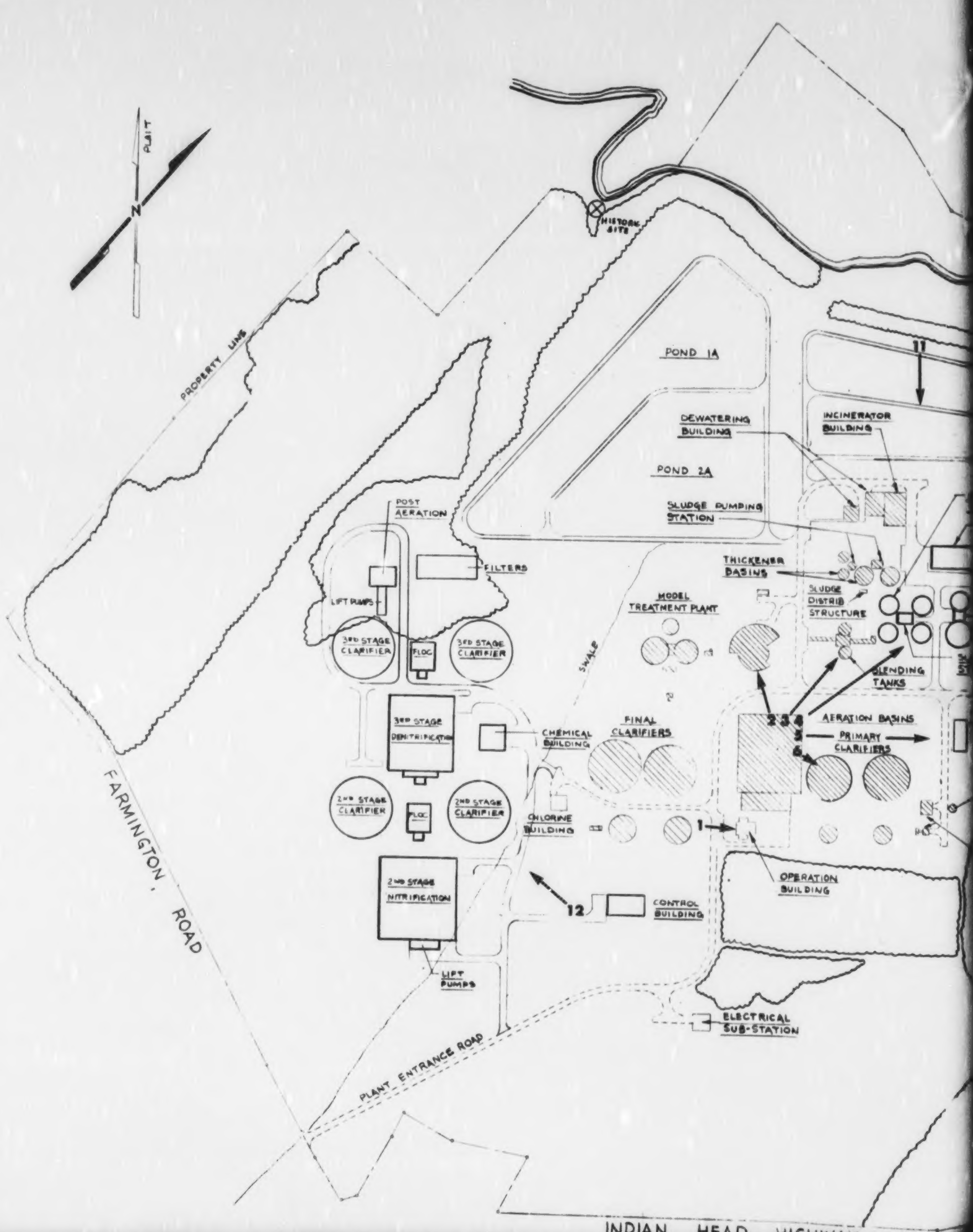
Washington, D.C.-Md.-Va. Standard Metropolitan Statistical Area

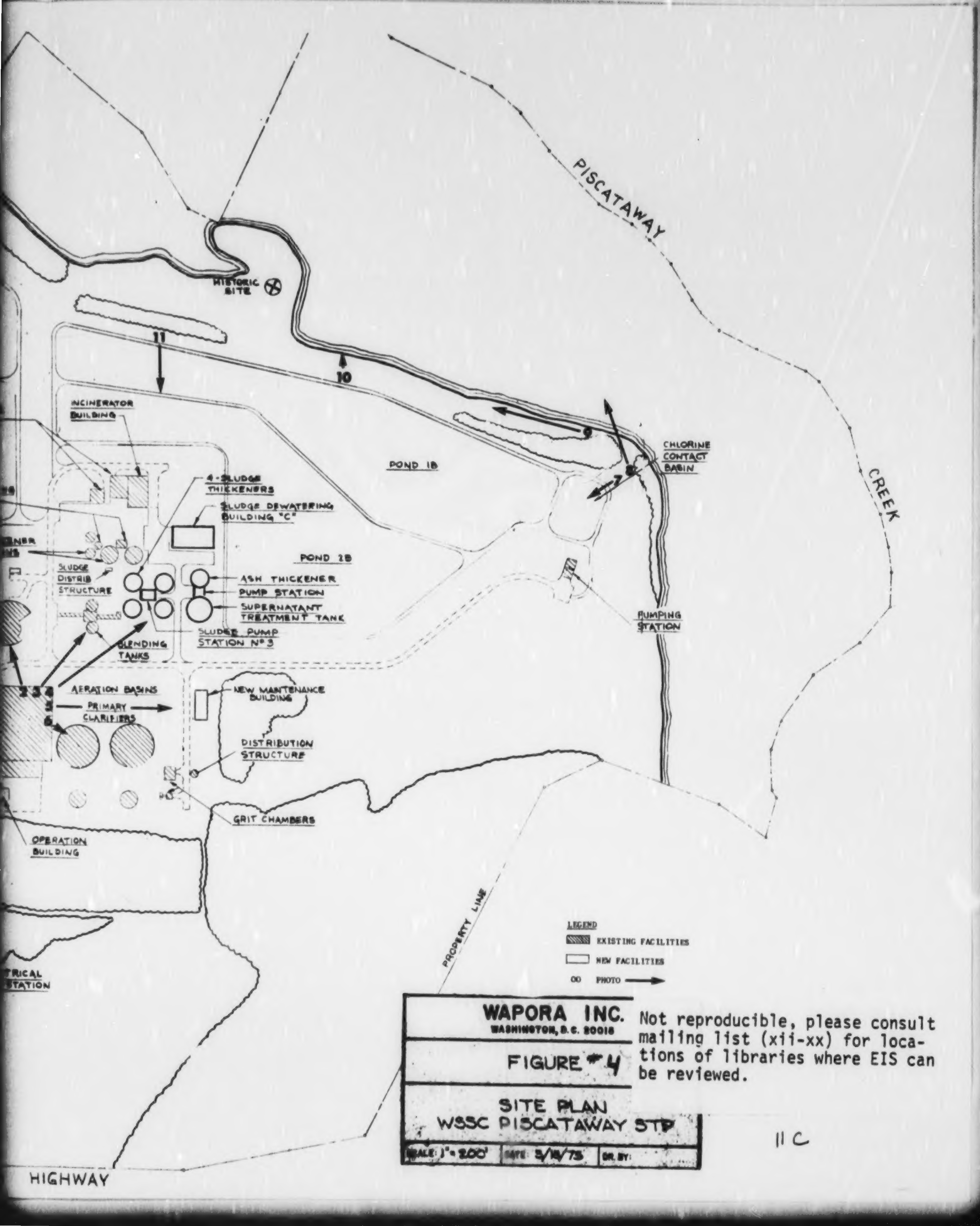
FIGURE 2



DESIGN SERVICE
and
POTENTIALLY SERVICEABLE AREAS
(Ultimate Capacity)
PISCATAWAY WASTEWATER TREATMENT
FACILITY

FIGURE 3


PLAT
N
PROPERTY LINE
HISTORIC SITE
POND 1A
POND 2A
11
DEWATERING BUILDING
INCINERATOR BUILDING
SLUDGE PUMPING STATION
THICKENER BASINS
SLUDGE DISTRIB STRUCTURE
BLENDING TANKS
MODEL TREATMENT PLANT
POST AERATION
FILTERS
LIFT PUMPS
3RD STAGE CLARIFIER
FLOC
3RD STAGE CLARIFIER
SWALE
3RD STAGE DENITRIFICATION
CHEMICAL BUILDING
FINAL CLARIFIERS
2 3 4
AERATION BASINS
5
PRIMARY CLARIFIERS
6
2ND STAGE CLARIFIER
FLOC
2ND STAGE CLARIFIER
CHLORINE BUILDING
1
OPERATION BUILDING
2ND STAGE NITRIFICATION
12
CONTROL BUILDING
LIFT PUMPS
ELECTRICAL SUB-STATION
PLANT ENTRANCE ROAD
FARMINGTON ROAD
INDIAN HEAD HIGHWAY



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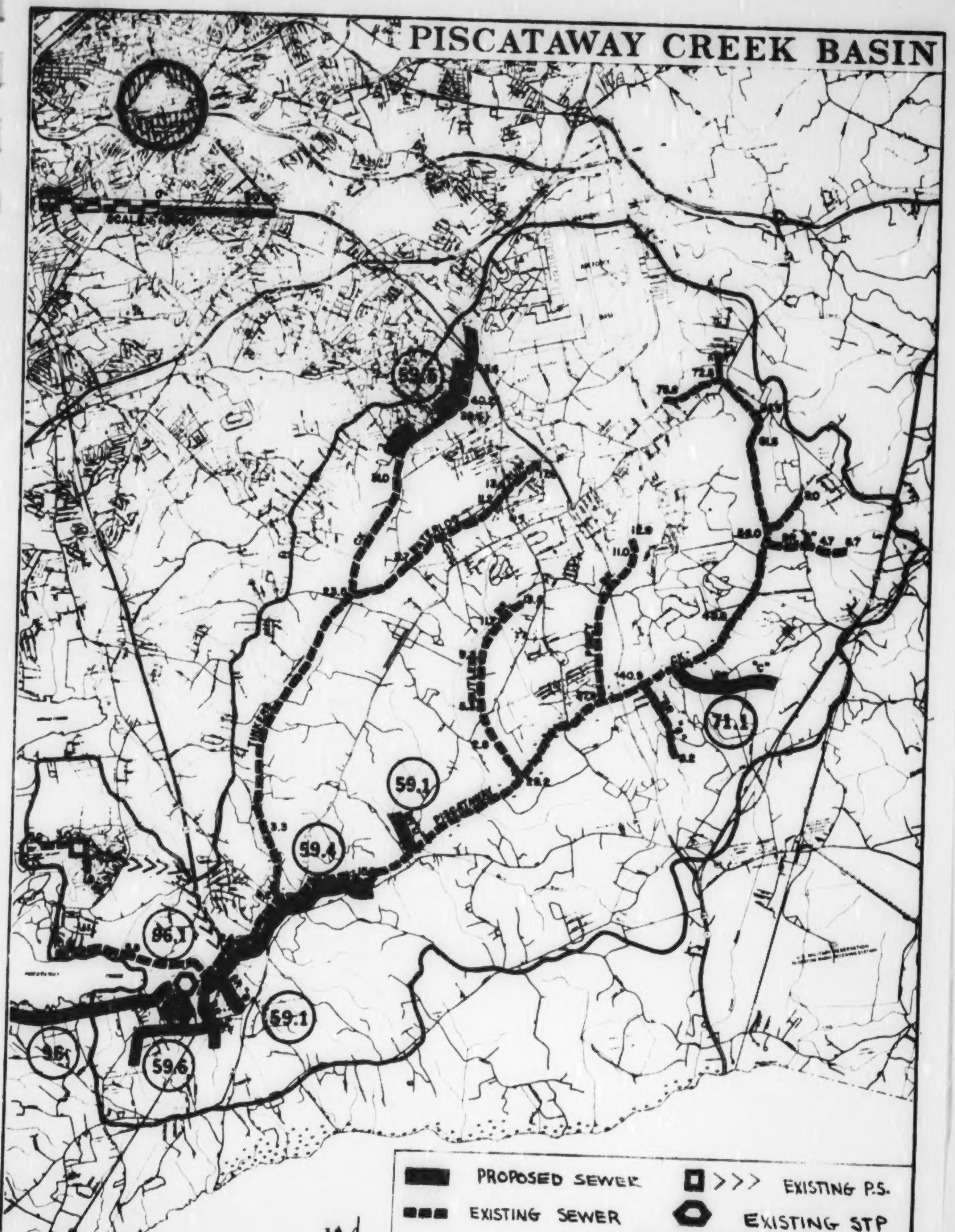
11 C


PISCATAWAY CREEK BASIN
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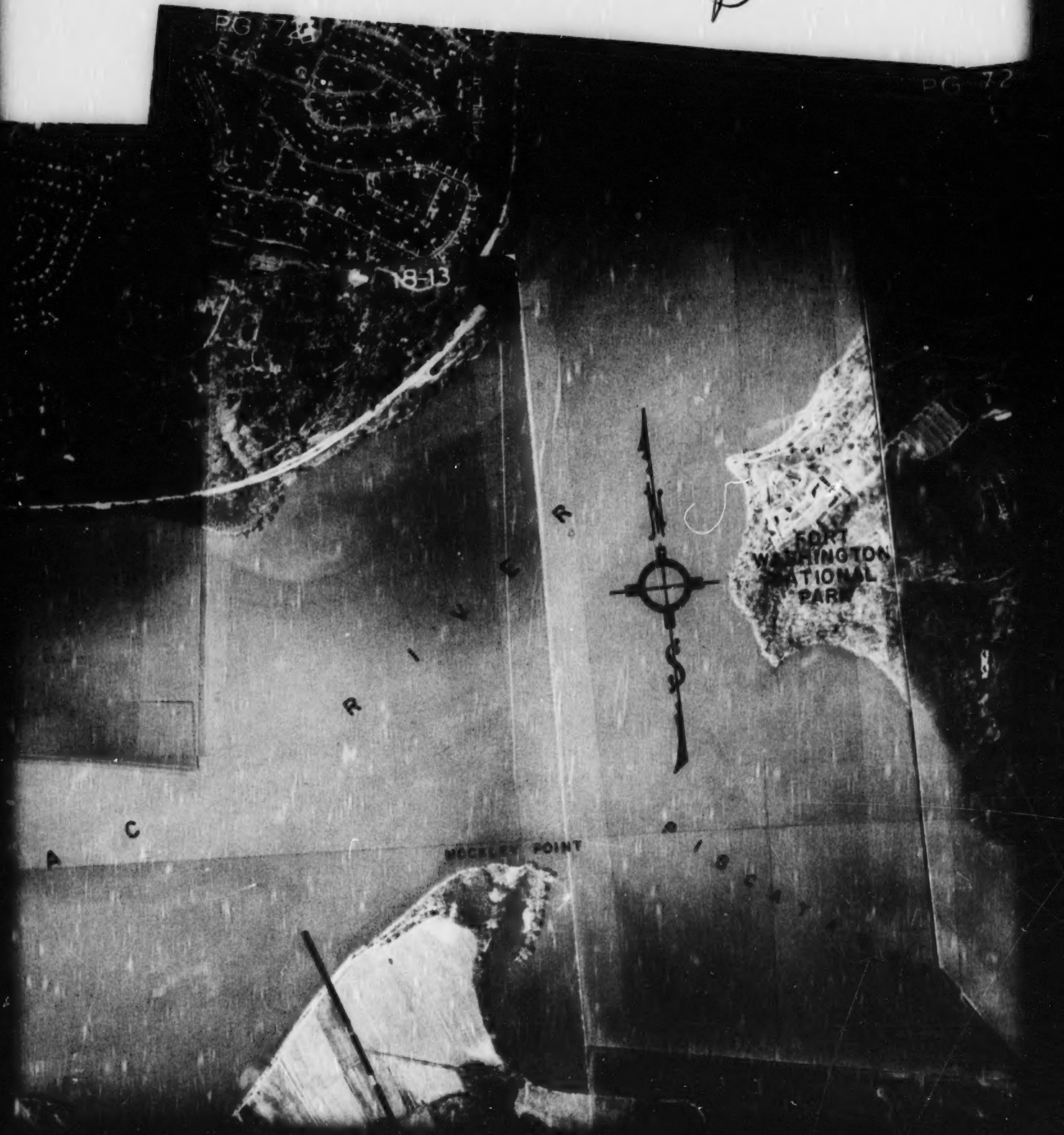
59.1
59.4
96.1
59.1
96
59.6
71.1
"C"
PROPOSED SEWER
EXISTING SEWER
>>> EXISTING P.S.
EXISTING STP

FIGURE 5

A

B



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PG 72
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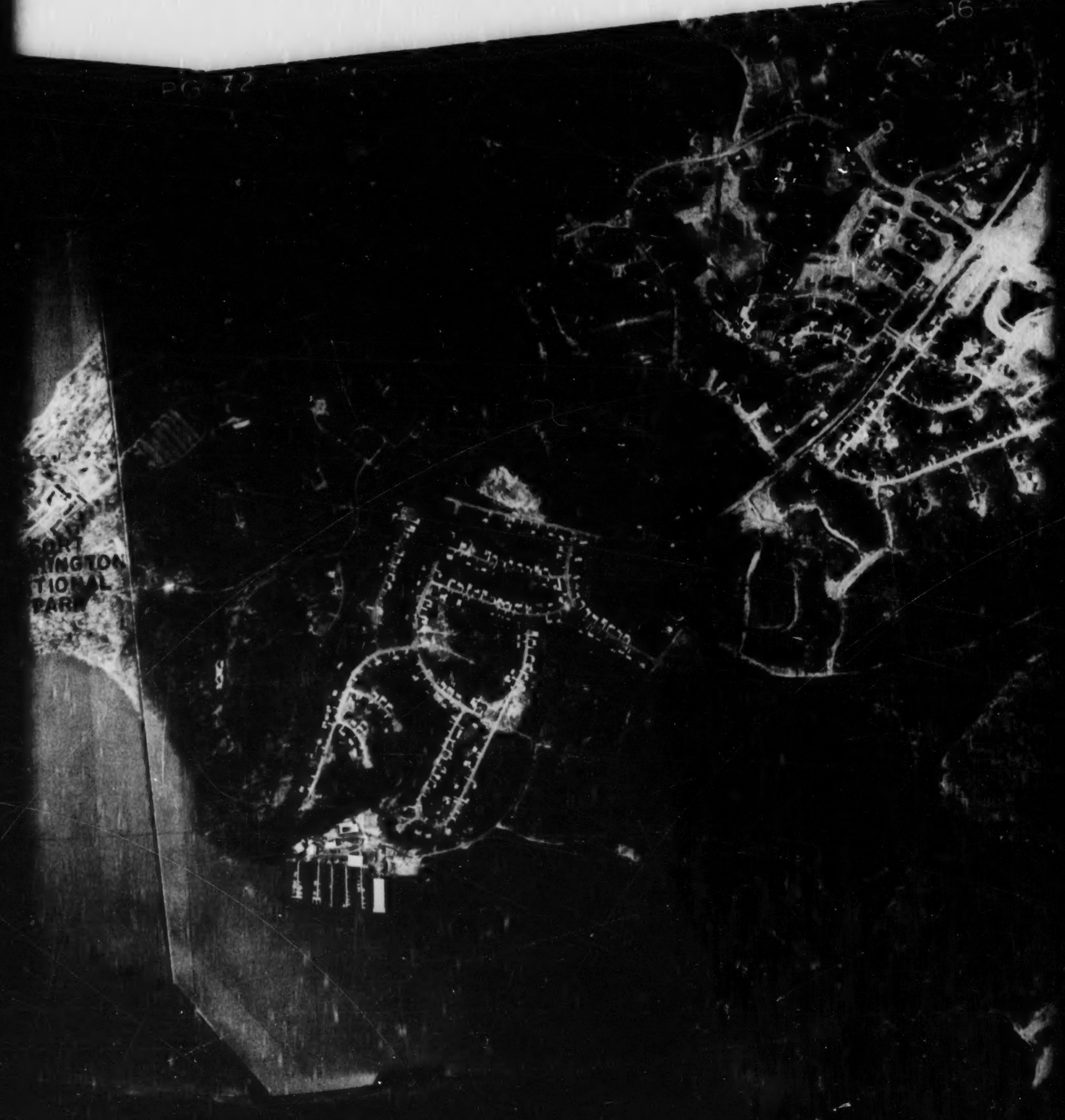
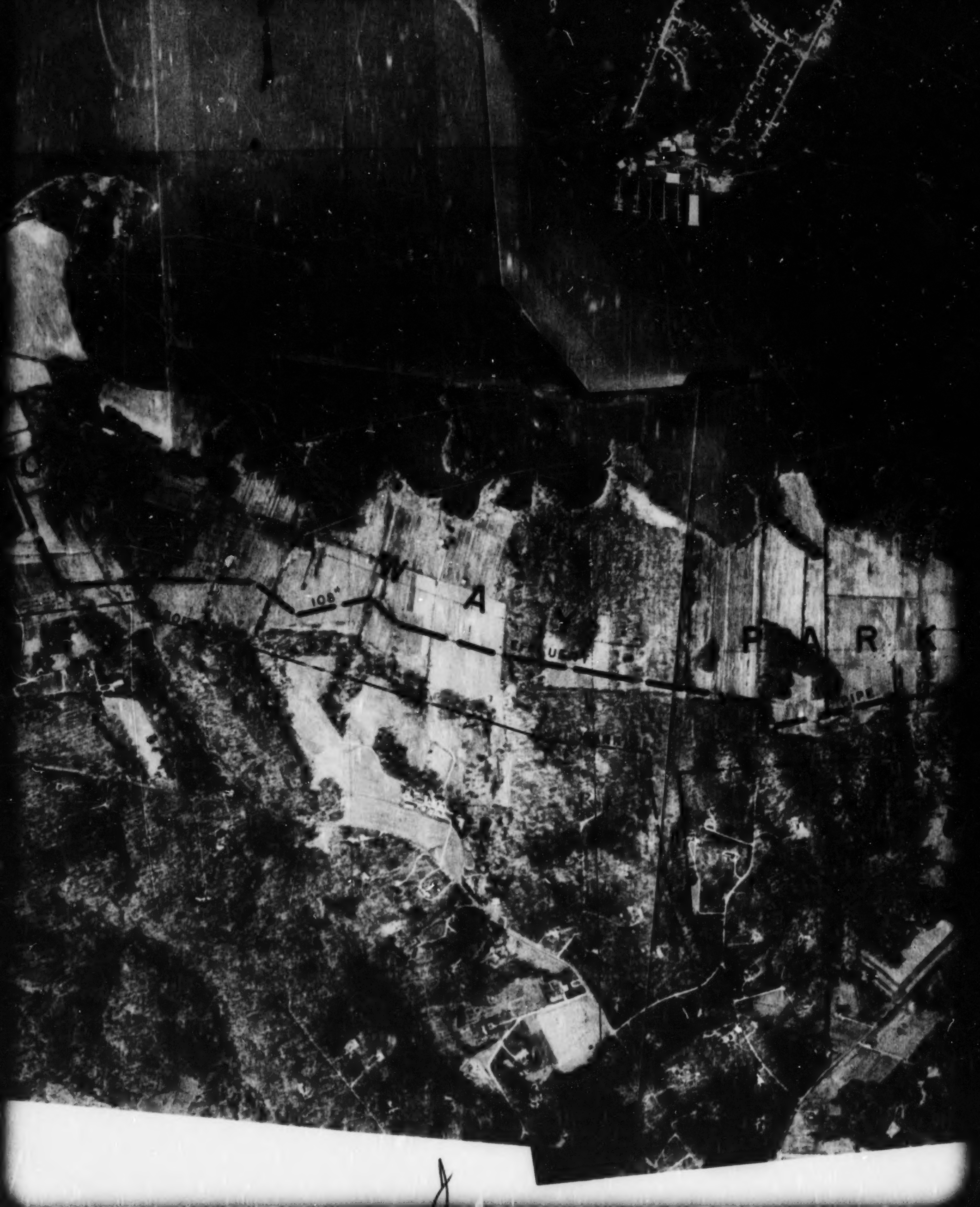


10

E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108"
PIPE

9

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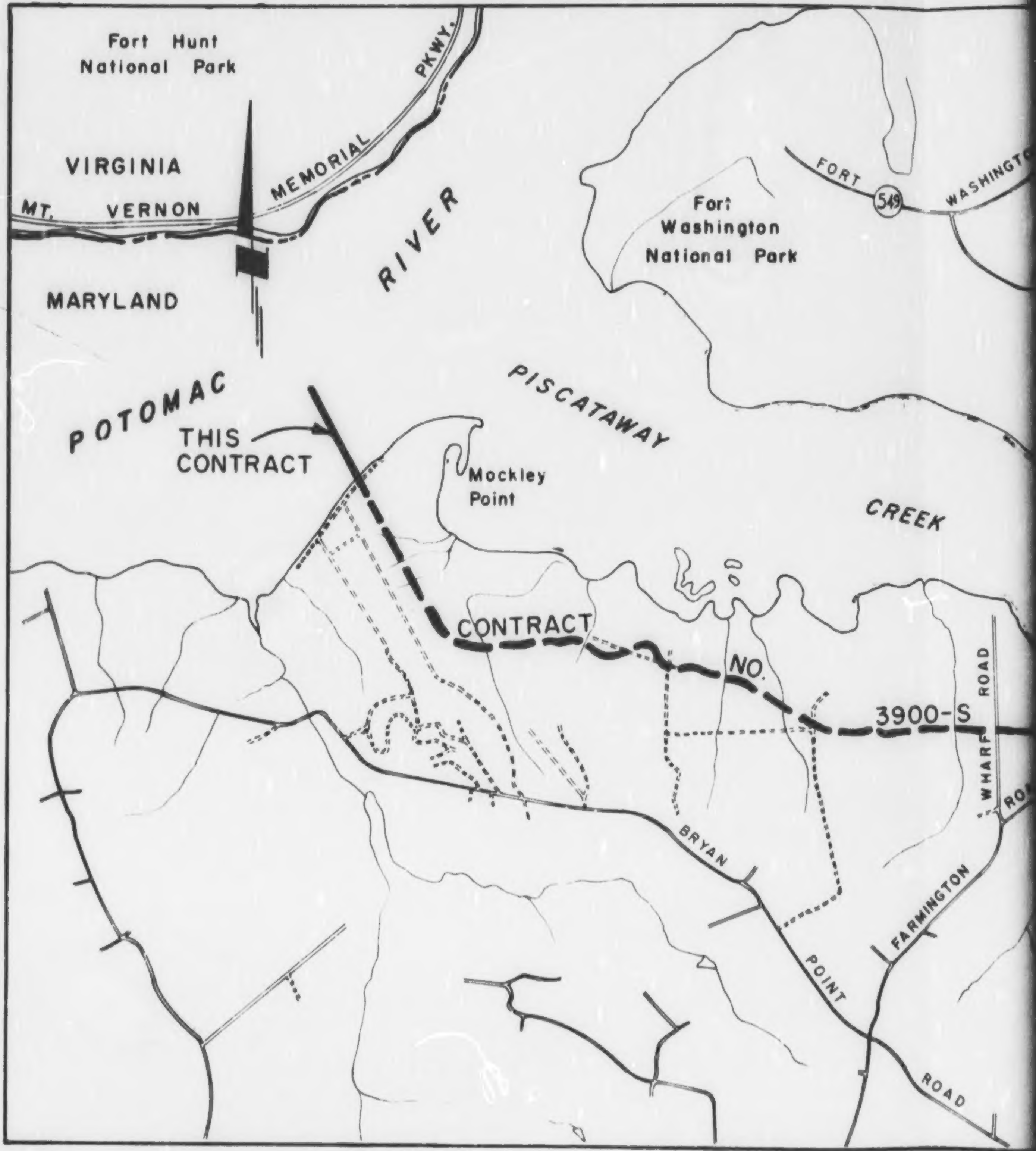
of libraries where EIS can be reviewed.

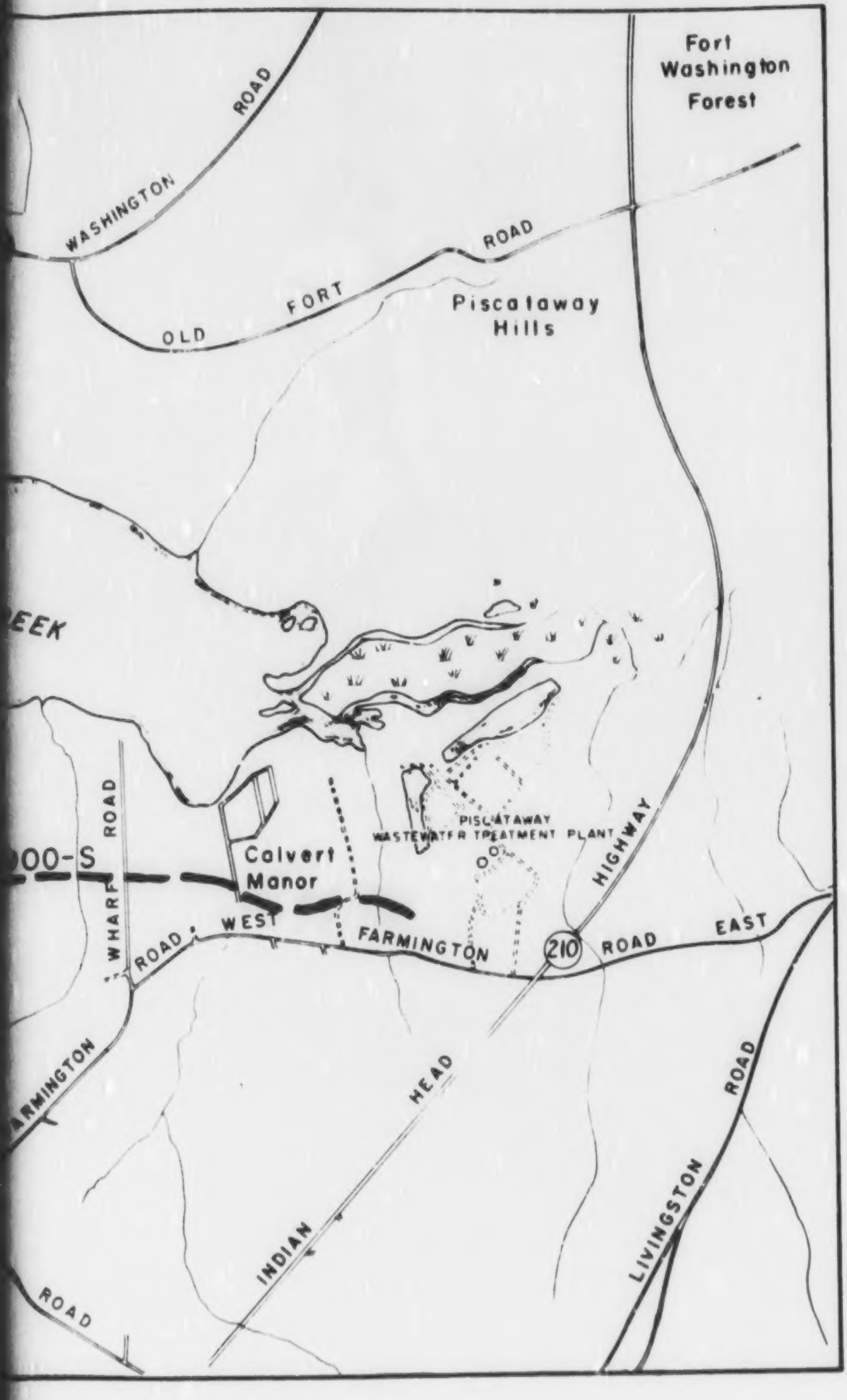
FIGURE 6 11e



A

VICINITY MAP

SCALE : 1" = 2000'



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PISCATAWA

108" EFFLU

FROM SHORELINE TO CHA

WASHINGTON
SANITARY C

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P

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Not reproducible, please consult mailing list (xii-xx) for locations of libraries where EIS can be reviewed.

PISCATAWAY DISTRICT
108" EFFLUENT PIPE
FROM SHORELINE TO CHANNEL OF POTOMAC RIVER

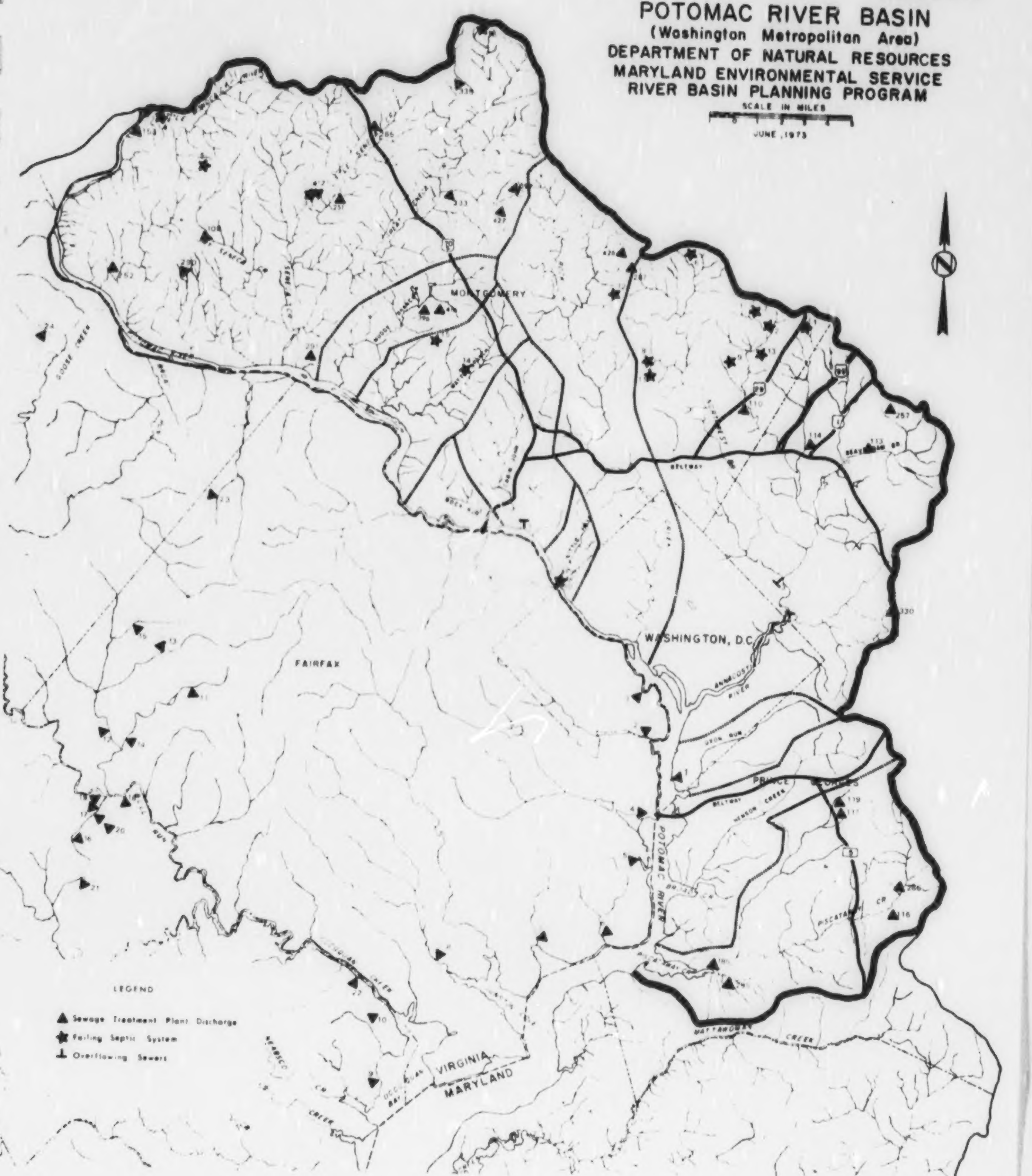
WASHINGTON SUBURBAN
SANITARY COMMISSION

DATE DIRECTOR OF PLANNING AND ENGINEERING 11 f

FIGURE 7

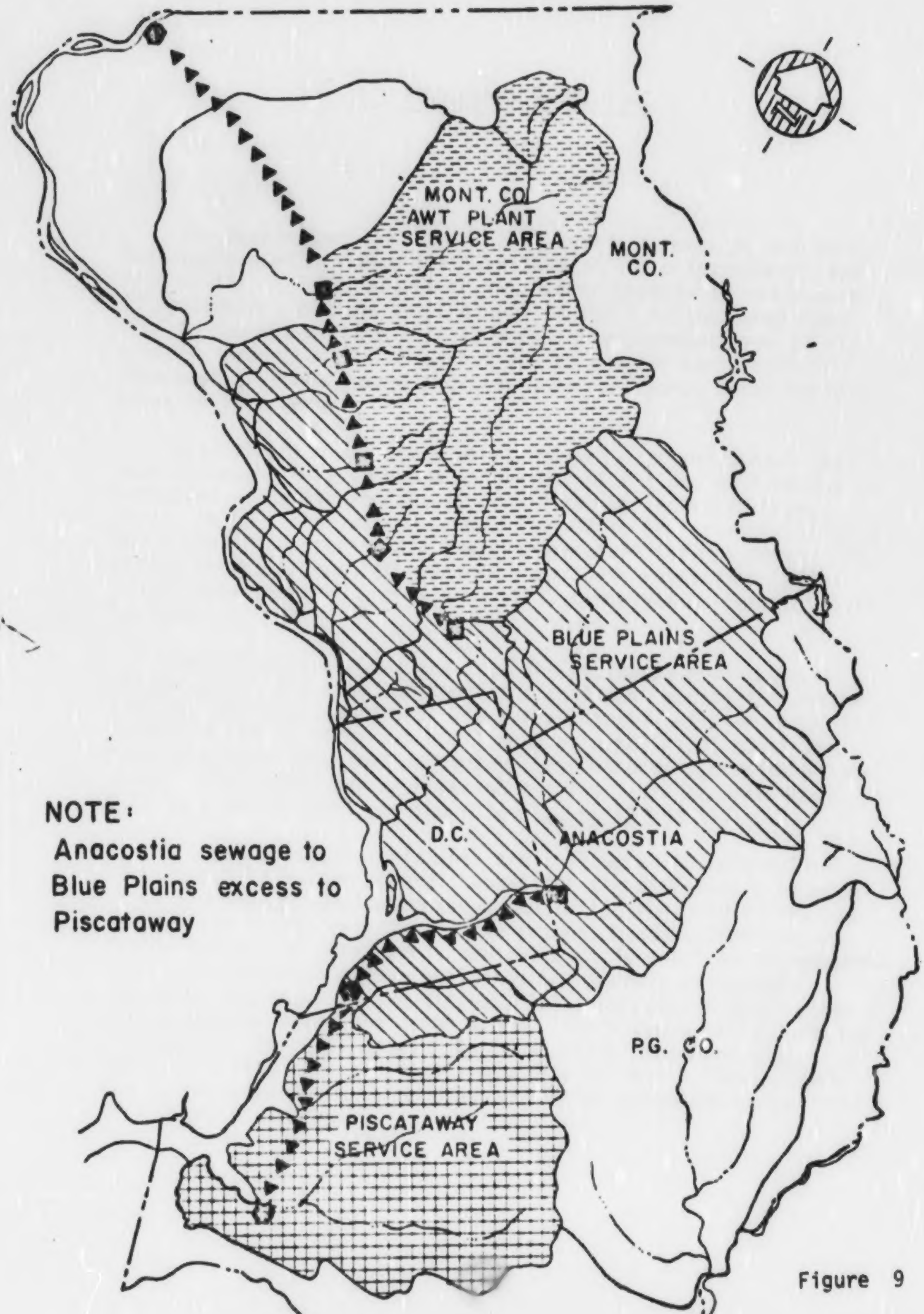
Existing Sewage Treatment Plants and Public Health Problems

POTOMAC RIVER BASIN
(Washington Metropolitan Area)
DEPARTMENT OF NATURAL RESOURCES
MARYLAND ENVIRONMENTAL SERVICE
RIVER BASIN PLANNING PROGRAM



11g

FIGURE 8



NOTE:
Anacostia sewage to Blue Plains excess to Piscataway

Figure 9

MAJOR REGIONAL FACILITIES

II. ENVIRONMENTAL SETTING

II.A. CLIMATE.

The Washington, D.C. SMSA has a humid, temperate, and predominantly continental climate, with warm and moist summers and mild winters. Temperatures in the summer usually do not exceed 95°F; however, extreme temperatures of 107°F in the summer and 26°F in the winter have been recorded. Temperatures are fairly uniform throughout the area, but due to greater variations in topography, Prince George's County does experience local variations in temperature.

Precipitation is fairly evenly distributed throughout the year although it is somewhat higher during the period from May to September. The average annual precipitation in Prince George's County is 45 inches with extremes from 18 to 68 inches. Tables 2 and 3 summarize precipitation and temperature for Montgomery and Prince George's Counties obtained from their respective United States Department of Agriculture, Soil Conservation Service, Soil Surveys.

The prevailing winds are from the northwest during the colder months and from the south and southwest during the period from May through September. The average annual wind velocity is between 8 and 10 miles per hour; however winds of 60 miles per hour or higher sometimes accompany severe thunderstorms or hurricanes. Wind roses for each season and the year for Washington, D.C. National Airport are shown in Figures 10 and 11.

All meteorological elements are influenced to some extent by cities. There are several causes for the differences between urban and nearby rural climates. The reflection, radiation, and evaporation characteristics of the swamps, meadows, forests and fields typical of rural areas are quite different from corresponding characteristics of the buildings and streets of asphalt, brick, concrete, and steel in the cities. The roughness of the surface varies between rural and urban areas. Winds are usually somewhat stronger in the rural areas. The combustion processes that take place in a city emit a sizeable quantity of heat. Finally, the dusts, gases, and vapors emitted in a city change the composition of the urban atmosphere.

TABLE 2

TEMPERATURE AND PRECIPITATION AT GLENN DALE BELL STATION[1], PRINCE GEORGE'S COUNTY, MARYLAND

[Elevation 151 feet]

MONTH	Temperature				Heating degree of days	Precipitation							
	Average Daily		Two years in 10 will have at least 4 days with-				One year in 10 will have-		Snow, sleet, and hail				
	Maxi-mum	Mini-mum	Maximum tempera-ture equal to or higher than-	Minimum tempera-ture equal to or lower than-	Base 65°F.	Aver-age	Less than-	More than-	Aver-age	Maxi-mum mon-thly	Year	Maxi-mum daily	Year
	°F.	°F.	°F.	°F.		Inches	Inches	Inches	Inches	Inches		Inchs.	
January------	45.7	24.5	65	6	927	3.43	1.9	5.9	5.0	30.5	1922	24.0	1922
February-----	47.6	24.2	67	10	815	2.83	1.5	3.9	5.8	21.7	1934	14.0	1958
March--------	55.9	30.5	77	13	676	3.84	1.5	5.9	4.8	20.8	1960	19.0	1942
April--------	67.7	40.6	85	57	339	3.54	1.4	6.0	.1	8.0	1924	8.0	1924
May----------	77.2	50.4	89	35	99	4.23	1.3	7.0	.0	8.0	----	0	----
June---------	84.8	59.2	93	46	0	4.00	1.7	6.6	0	0	----	0	----
July---------	87.8	63.6	96	53	0	4.69	1.9	8.1	0	0	----	0	----
August-------	86.5	62.0	95	50	0	5.07	1.3	10.0	0	0	----	0	----
September----	80.7	54.6	92	39	48	3.86	.7	7.6	0	0	----	0	----
October------	69.4	43.5	85	29	270	3.36	.7	7.2	(2)	3.0	1925	2.0	[3]1940
November-----	58.4	33.3	74	20	573	3.22	.9	6.1	.7	7.3	1938	7.0	1938
December-----	46.7	24.9	65	8	899	2.97	1.5	5.1	4.0	15.0	1932	10.5	1957
Year-----	67.4	42.6	----------	---------	4,646	45.04	34.9	55.7	20.4	30.5	1922	24.0	1922

---

[1] Record for the period 1945-60. [2] Trace. [3] Also occurs on earlier dates.

TABLE 3

TEMPERATURE AND PRECIPITATION AT BOYDS, MONTGOMERY COUNTY, MD.

[Elevation, 580 ft.]

MONTH	TEMPERATURE(1)			PRECIPITATION(2)			
	AVERAGE °F	ABSOLUTE MAXIMUM °F	ABSOLUTE MINIMUM °F	AVERAGE (INCHES)	DRIEST YEAR 1930 (INCHES)	WETTEST YEAR 1952 (INCHES)	AVERAGE SNOWFALL (INCHES)
December	35.7	72	–4	2.62	2.54	2.96	3.1
January	33.1	78	–17	3.04	2.40	3.96	5.6
February	34.6	80	14	2.59	1.73	1.86	5.9
Winter	34.5	80	–17	8.25	6.67	8.78	14.6
March	43.4	87	0	3.08	2.40	4.55	3.8
April	52.5	94	11	3.18	3.20	7.86	.4
May	62.6	97	29	3.52	1.15	5.92	(3)
Spring	52.8	97	0	9.78	6.75	18.33	4.2
June	71.3	102	35	3.73	2.86	4.89	0
July	75.2	106	45	3.47	.33	3.13	0
August	73.6	106	41	4.12	.82	9.19	(3)
Summer	73.4	106	35	11.32	4.01	17.21	0
September	68.0	102	31	3.31	.60	5.12	0
October	56.0	97	19	3.11	.29	1.17	.2
November	45.6	86	2	2.73	.78	6.25	.7
Fall	56.5	102	2	9.15	1.67	12.54	.9
YEAR	54.3	106	–17	38.50	19.10	56.86	19.7

(1) Average temperature based on a J-year record, through 1950; highest and lowest temperatures on a 29-year record, through 1952.

(2) Average precipitation based on a 32-year record, through 1952; wettest and driest years based on a 29-year record, in the period 1930-52; snowfall based on a 29-year record, through 1952.

(3) Trace.

SOURCE: Soil Survey, Montgomery County
U.S. Department of Agriculture
Soil Conservation Service

Wollum[1] has made detailed analyses of maximum and minimum temperatures at 13 to 29 points in the Metropolitan Washington area. He has shown that minimum temperatures in rural areas average 4°F to 5°F cooler than those in the vicinity of the Washington National Airport. His studies show that maximum temperatures tend to be higher in the northwest portion of the District near the Potomac River and in the northeast portion along the Anacostia River.

An analysis of wind data at the Dulles International Airport, Washington National Airport, Andrews Air Force Base, Suitland and Continuous Air Monitoring Program (CAMP) stations, Friendship International Airport and meteorological towers at Silver Hill and Tysons Corner conducted by the Division of Meteorology (then part of the National Air Pollution Control Administration) in 1967 did not reveal a consistent circulation that might be attributed to the variations in temperatures.

The nighttime stability in Washington, D.C. city center should be less and inversions and stable layers more frequently elevated than in rural areas. Pollutants emitted at building-top level in the city would tend to accumulate somewhat above street level and then be brought to the surface the following morning. In rural areas, it would be somewhat easier to emit pollutants above the low-lying inversion, where they would be susceptible to better dispersion. The microclimatology of the Metropolitan Washington Area shows the same urban influences as other major cities. It does not seem to have any unusual patterns which would contribute to particular zones of pollution buildup.

II.B. GEOLOGY.

Figure 12, taken from the Metropolitan Washington Council of Governments (COG), "Natural Features of the Washington Metropolitan Area," provides a geologic overview of the Washington, D.C. SMSA. As depicted on Figure 12, Prince George's County almost entirely falls within the Coastal Plain physiographic province. Generally the Coastal Plain is an area of low relief underlain by stratified, irregular, and unconsolidated beds of clay, marl, sand, and gravel which lie upon crystalline rocks at depths which vary from a few feet to two to three thousand feet. The northern part of Prince George's County is gently rolling with broad valleys as compared to the southern part which is a partially dissected plateau that is nearly level except near the Potomac River where there are valleys with short steep slopes.

---

[1] SOURCE: Weatherwise, "Notes from a Study of the Microclimatology of the Washington, D.C. Area for the Winter and Spring Seasons" Wollum, Clarence A., 1964.

Most of the Montgomery County is in the Piedmont Plateau which is a very old, strongly weathered, eroded, peneplain characterized by a gently rolling topography with occasionally steep slopes formed by streams.

Tables 4 and 5 (also taken from COG's "Natural Features"), in conjunction with Figure 12, describe the physiographic provinces in terms of: topography; depth to bedrock; excavation characteristics; foundation conditions and use; permeability; depth of wells; yield of wells; and groundwater features. However, the Brandywine Gravel formation is not included in Table 4 and a short description follows: the Brandywine Gravel formation consists of ancient alluvium sands sloping gently downward from approximately 300 feet above sea level; the Potomac sands contain many pebbles of chert about 40 feet thick.

II.C. SOILS.

Figure 13 taken from COG's "Natural Features: depicts the general soil associations of the Washington, D.C. SMSA.

The soil associations in Prince George's County include: Manor-Glenelg (1); Beltsville-Leonardtown-Chillum (14); Cristiana-Sunnyside-Beltsville (15); Collington-Adelphia-Monmouth (16); Bibb-Tidal (20); Sassafras-Keyport-Elkton (17); Sassafras-Croom (17); Collington-Matapeake-Galestown (16); Westphalia-Marr-Howell (18); and Westphalia-Evesboro-Sassafras (18). About 67 percent of these soils are well drained; about 22 percent moderately well drained; and about 11 percent poorly and very poorly drained. More than 68 percent of the soils of Prince George's County are suitable for cultivation with an additional 12 percent suitable for pasture. Most of the remaining acreage is too steep, eroded, or wet for agricultural use; these areas are best suited for wildlands, woodlands and recreation areas.

The soil associations in Montgomery County also are depicted in Figure 13 and are predominantly Manor-Edgement-Brandywine (1), Manor-Linganore-Oglenelg (1), Penn-Lewisberry (11), and Conowingo-Aldino-Iredell (4). More than 81 percent of the County's area is suitable for cultivation with 16 percent suitable for pasture. The topsoil in Montgomery County is shallow to moderately deep. Only 3 percent is classified as not suitable for agricultural use--mainly because its topography is too steep or rough.

Table 6 describes each of the above named soil associations and was also taken from COG's "Natural Features."

TABLE 4

GEOLOGIC FORMATIONS OF THE WASHINGTON METROPOLITAN AREA: GENERAL INTERPRETATION

COASTAL PLAIN PROVINCE[1]

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9		Col 10
MAP UNIT AND LEGEND NUMBER	TOPOGRAPHY	THICKNESS	EXCAVATION CHARACTERISTICS	FOUNDATION[5] CONDITIONS	SLOPE STABILITY (V=Vertical H=Horizontal)	SUITABILITY FOR SEPTIC TANK DRAIN FIELDS	GROUNDWATER FEATURES	YIELD OF WELLS (gallons per minute)		REMARKS
								Range	Median	
COASTAL PLAIN										
Alluvium 18	Nearly flat flood plains marked locally by terrace scarps, and curved, subparallel channel scars; local relief commonly less than 3'.	Commonly 15' or thicker (as much as 60' beneath & adjacent to the Potomac River)	Easy to excavate by power equipment; in rivers may be excavated by dredge.	Bearing capacity poor to fair in sandy alluvium; very poor to poor on silt, clay. Structures founded over small lenses of compressible clay or silt settle unevenly. Water table shallow. Compressibility & expansion negligible except in thick organic deposits. (See remarks)	Excavations below water table require support.	Poor	Major aquifer when direct hydraulic connection present with stream or river.	5-300	50	Area subject to flooding, no structures should not be built. Some sand and gravel produced from this unit, particularly along Indian Creek in Prince George's County.
Chesapeake Group 16	Typically underlie flat ground with very low relief.	Generally 0 to about 100'. Thickens to about 250'.	Easy to excavate with power equipment; moderately difficult in cemented zones.	Bearing capacity fair in sandy beds; poor in clayey silt even though somewhat precompressed. Compressibility low to medium; expansion negligible to moderate depending mostly on montmorillonite content (clay mineral)	Stand in slopes 2H: 1V without support for long periods. Repeated wetting & drying may cause slopes in cohesive sand to ravel.	Moderate	Chesapeake group minor aquifer.	5-860	285	Poor foundation support.
Nanjemoy Formation 16	Nanjemoy formation commonly occurs in large river valleys, underlying smooth slopes & flat valley bottoms; swampy conditions widespread.	About 150' thick.	Easy to excavate by power equipment. Wet conditions hamper excavation.	Precompressed; bearing capacity ranges from poor to fair. Compressibility, low to medium. Expansion generally slight; but may be high locally in montmorillonitic beds.	Stands for long periods in slopes 2H: 1V without support. Steeper slopes may stand temporarily but will probably fail eventually. Steep-sided excavations extending below water table need support.	Poor to moderate	Primarily a confining bed.	Little ground water		Should not be used as fill.
Aquia Formation 15	Well-drained area of low, gently rolling hills.	As much as 60' in outcrop; thickens to about 150' in subsurface.	Generally easy to excavate with power equipment. Hard limestone may need blasting.	Clayey silt beds, precompressed. Bearing capacities range from fair in clayey sand to good in indurated beds. Compressibility & expansion generally slight to negligible.	Cut slopes in sand ravel, but stable at angle of repose; about 2H:1V angle of stable cut slopes generally increases as clay content increases. Permanent slopes should be planned for 2H:1V or gentler. Indurated beds in shallow excavation stand for long periods in steep to near-vertical slopes.	Moderate to good	Aquia Formation major aquifer.	3-400	25	Moderately good fill material.
Monmouth Formation (including underlying Matawan formation) 13	Typically dissected terrain; surfaces poorly drained.	In outcrop areas averages about 50'. Thickens in subsurface to 100', though this thickness may include underlying Matawan Formation.	Easy to excavate with power equipment, except for scattered concretionary zones.	Precompressed; bearing capacity poor to fair. Compressibility low; expansion slight.	Natural stream cuts from moderate slopes. Steep cut slopes stable only when dry. Excavations with steep slopes extending below water table need support.	Poor	Confining bed over artesian aquifers. Matawan Formation is a major aquifer.	Little ground water		Formation acidic; needs quantities of lime to grow grass.
[illegible]	Very hills [illegible]	As much as [illegible]	Usually [illegible]	Bearing capacity [illegible]	Sandy beds [illegible]	Poor to [illegible]	Clay [illegible]	Little ground		[illegible]

Chesapeake Group 16	Typically underlie flat ground with very low relief.	Generally 0 to about 100'. Thickens to about 250'.	Easy to excavate with power equipment; moderately difficult in cemented zones.	Bearing capacity fair in sandy beds; poor in clayey silt even though somewhat precompressed. Compressibility low to medium; expansion negligible to moderate depending mostly on montmorillonite content (clay mineral	Stand in slopes 2H: 1V without support for long periods. Repeated wetting & drying may cause slopes in cohesive sand to ravel.	Moderate	Chesapeake group minor aquifer.	5-860	300	Poor foundation support.
Nanjemoy Formation 14	Nanjemoy formation commonly occurs in large river valleys, underlying smooth slopes & flat valley bottoms; swampy conditions widespread.	About 150' thick.	Easy to excavate by power equipment. Wet conditions hamper excavation.	Precompressed; bearing capacity ranges from poor to fair. Compressibility, low to medium. Expansion generally slight; but may be high locally in montmorillonitic beds.	Stands for long periods in slopes 2H: 1V without support. Steeper slopes may stand temporarily but will probably fail eventually. Steep-sided excavations extending below water table need support.	Poor to moderate	Primarily a confining bed.	Little ground water		Should not be used as fill.
Aquia Formation 15	Well-drained area of low, gently rolling hills.	As much as 60' in outcrop; thickens to about 150' in subsurface.	Generally easy to excavate with power equipment. Hard limestone may need blasting.	Clayey silt beds, precompressed. Bearing capacities range from fair in clayey sand to good in indurated beds. Compressibility & expansion generally slight to negligible.	Cut slopes in sand ravel, but stable at angle of repose; about 2H:1V angle of stable cut slopes generally increases as clay content increases. Permanent slopes should be planned for 2H:1V or gentler. Indurated beds in shallow excavation stand for long periods in steep to near-vertical slopes.	Moderate to good	Aquia Formation major aquifer.	2-406	25	Moderately good fill material.
Monmouth Formation (including underlying Matawan formation) 13	Typically dissected terrain; surfaces poorly drained.	In outcrop areas averages about 50'. Thickens in subsurface to 100', though this thickness may include underlying Matawan Formation.	Easy to excavate with power equipment, except for scattered concretionary zones.	Precompressed; bearing capacity poor to fair. Compressibility low; expansion slight.	Natural stream cuts from moderate slopes. Steep cut slopes stable only when dry. Excavations with steep slopes extending below water table need support.	Poor	Confining bed over artesian aquifers. Matawan Formation is a major aquifer.	Little ground water		Formation acidic; needs quantities of lime to grow grass.
Arundel and Patapsco Formation 12	Very hilly terrain of moderate relief; drainage poor.	As much as 300' in outcrop; thickens in subsurface.	Usually moderately difficult to excavate with heavy power equipment; hard ironstone beds may require blasting. Excessive rebound possible within deep excavations dug in clays.	Bearing capacity poor. Bearing capacity decreases with depth where clay beds confine artesian aquifers. Clay precompressed.	Sandy beds ravel on cut slopes of 45° or steeper but stable to angle of repose. Clayey beds usually stable at 2H:1V depend- on water conditions.	Poor to very poor	Clay impermeable. Sandy beds contain water under artesian conditions; but these are not thick enough to contain much water. At depth sandy layers become a major aquifer.	Little ground water		Main source of brick clay in Metropolitan area. Lignitic clay lenses extremely acid; needs liberal application of lime to grow grass.
Patuxent Formation 11	Very hilly terrain of moderate relief. Surface drainage generally good.	As much as 350' in outcrop area, somewhat more in subsurface.	Usually easy to excavate with power equipment; hard ironstone beds may require blasting. Excessive rebound possible within deep excavations dug in clay beds. Artesian aquifers may "boil" when cut in a deep excavation.	Bearing capacity variable. Affected locally by artesian water pressure. Clay beds similar to those in Arundel Formation. Bearing capacity decreases with depth where clay beds confine artesian aquifers. Clay precompressed.	Sandy beds ravel on steep cut slopes, but stable up to angle of repose. Clayey beds usually stable at 2H:1V depending on water conditions	Good	Major aquifer; water occurs under artesian conditions. Water table aquifer near outcrop	3-1,000	375	Main source of sand and gravel in Prince George's County, Maryland; and Fairfax County, Virginia.

1. Adapted from Engineering Geology of the Northeast Corridor: Washington, D. C., to Boston, Massachusetts. United States Geological Survey, Washington, D. C., 1967.

2. Unweathered rock crops out along major drainages.

3. Includes measure of drillability for tunneling and boring: 1 = hard; 6 = easy.

4. Wells at low elevations are generally more productive than those at high elevations.

5. Foundation Stability:

   very poor = 1 ton per square foot or less
   poor = 1-4 tons per square foot
   fair = 4-8 tons per square foot
   good = 8-25 tons per square foot
   excellent = 25 or more tons per square foot

   "Approximate bearing capacity (tons per square foot) developed from local practice of a footing 4 foot square, above the water table; below the water table bearing capacity should be reduced 50 per cent or more. Bearing capacities of wider footings should be reduced 20 to 40 per cent from the above figures." Adapted from Duncan, Neil, Geology and Soils Engineering: Part 5- "Soil Exploration": Muck Shifter, Vol. 23, No. 8, 1965, pp. 29-33.

B

TABLE 5

GEOLOGIC FORMATIONS OF THE WASHINGTON METROPOLITAN AREA: GENERAL INTERPRETATION

BLUE RIDGE, PIEDMONT, & TRIASSIC PROVINCES[1]

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6			Col 7		Col 8		Col 9	Col 10
MAP UNIT AND LEGEND NUMBER	TOPOGRAPHY	DEPTH TO BEDROCK[2] (thickness of weathered zone)	EXCAVATION CHARACTERISTICS[3]	FOUNDATION CONDITIONS AND USE	PERMEABILITY			DEPTH OF WELLS (feet)		YIELD OF WELLS[4] (gallons per minute)		GROUNDWATER FEATURES	REMARKS
					In Unweathered Rock	In Fractures	In Weathered Rock	Range	Median	Range	Median		
BLUE RIDGE & PIEDMONT													
Biotite-quartz-feldspar gneiss 1	Rolling & hilly upland.	Maximum 150' Average 25'	Overbreak and rock loads mostly slight to moderate depending on frequency of fractures (joints & faults) alteration, and orientation of excavation to major joint systems. Scaling moderate: Drillability-3		---	X	---	18-3,000	157	0-365	11	Water occurs in weathered zone near surface commonly from a depth less than 150'. Maximum yields from major fault zones.	When used as fill, mica in weathered rock makes compaction to 95 percent difficult.
Amphibolite, epidote amphibolite, & morphosed gabbro 9	Hills to low mountains: rugged in places, especially near rivers.	Maximum 150' Average 25'	Overbreak reported moderate to excessive depending on orientation of excavation to major joint systems. Rock loads mostly slight. Swelling ground probable in wet shear zones. Contains fibrous minerals which may slow excavation by boring machine: Drillability-2		---	X	---	35-750	155	0.5-150	12	Water occurs in weathered zone at shallow depth, probably not much below 150'. Maximum yields from major fault zone.	
Granitic rocks 2	Upland terrain of ridges: but commonly low local relief.	Maximum 100' Average 35'	Overbreak & rock load generally minimal. Rock locally in high state of compression: popping & spalling increases with depth. Very high stress may deform deep underground openings. Open joints water bearing locally & persistent with depth. Fibrous rock will slow excavation by boring machine: Drillability-4	Building stone, Crushed rock	---	X	---	14-750	140	0.5-45	10	Water occurs chiefly in porous and permeable weathered overburden: joints & fractures act as conduits. Highest yields obtained in valleys & draws.	When used as fill, mica in weathered rock makes compaction to 95 percent difficult.
Serpentinite, steatite, & related ultramafic rocks 7	Generally low rolling topography: locally massive bodies may be prominent.	Less than 25'	Exceedingly difficult rock to work. Overbreak & rock loads excessive. Swelling & squeezing ground usual along wet shear zones. High stage of stress likely in massive serpentinite bodies: Drillability 2-5	Crushed stone. Foundation Conditions: Some swelling in shears and faults.	---	X	---	11-500	104	3-10	5	Weathered mantle is thin & clayey. Water generally obtained at or near the contact between weathered overburden & unweathered rock. Rock is closely fractured.	
Coarse mica schist & mica gneiss 10	Rolling to hilly uplands.	Maximum 200' Average 50'	Moderately easy to excavate. Machine boring slowed by quartz pods & other hard inclusions. Overbreak generally slight but depends partly on orientation of excavation to foliation partings. Rock load variable: moderate in altered rock: excessive in shear zones. Squeezing ground in wet shear zones probable: Drillability 5-6	Building stone	---	X	X	13-1,000	118	0.2-110	14	Surface weathering & leaching leave a porous skeleton of silica clay & mica in both soil & upper part of bedrock. Little increase in well yield below 200'?	When used as fill, mica in weathered rock makes compaction to 95 percent difficult.
Fine-grained mica schist, chlorite schist, and phyllite with interbedded quartzose rocks 6	Rolling and hilly upland	Maximum 200' Average 50'	Relatively easy to excavate. Machine boring slowed by quartz pods & other hard inclusions. Overbreak & rock loads mostly slight except in large fault & shear zones & in highly altered rock; squeezing ground common in wet shear zones. Scaling slight to moderate, increasing in		---	X	X	40-380	103	10-45	15		When used as fill, mica in weathered rock makes compaction to 95 percent difficult.

rocks 2	side of ridges but commonly low local relief	100' Average 35'	load generally minimal. Rock locally in high state of compression; popping & spalling increases with depth. Very high stress may deform away underground openings. Open joints water bearing locally & persistent with depth. Fibrous rock will slow excavation by boring machine; Drillability-4	Crushed rock								chiefly in porous and permeable weathered overburden; joints & fractures act as conduits. Highest yields obtained in valleys & draws.	fill, mica in weathered rock makes compaction to 95 percent difficult.
Serpentinite, steatite, & related ultramafic rocks 7	Generally low rolling topography; locally massive bodies may be prominent.	Less than 25'	Exceedingly difficult rock to work. Overbreak & rock loads excessive. Swelling & squeezing ground usual along wet shear zones. High stage of stress likely in massive serpentinite bodies; Drillability 2-5	Crushed stone. Foundation Conditions: Some swelling in shears and faults.	---	x	---	11-500	104	3-10	5	Weathered mantle is thin & clayey. Water generally obtained at or near the contact between weathered overburden & unweathered rock. Rock is closely fractured.	
Coarse mica schist & mica gneiss 10	Rolling to hilly uplands.	Maximum 200' Average 50'	Moderately easy to excavate. Machine boring slowed by quartz pods & other hard inclusions. Overbreak generally slight but depends partly on orientation of excavation to foliation partings. Rock load variable; moderate in altered rock; excessive in shear zones. Squeezing ground in wet shear zones probable; Drillability 5-6	Building stone	---	x	x	13-1,000	118	0.2-110	14	Surface weathering & leaching leave a porous skeleton of silica clay & mica in both soil & upper part of bedrock. Little increase in well yield below 200'	When used as fill, mica in weathered rock makes compaction to 95 percent difficult.
Fine-grained mica schist, chlorite schist, and phyllite with interbedded quartzone rocks 6	Rolling and hilly upland	Maximum 200' Average 50'	Relatively easy to excavate. Machine boring slowed by quartz pods & other hard inclusions. Overbreak & rock loads mostly slight except in large fault & shear zones & in highly altered rock; squeezing ground common in wet shear zones. Scaling slight to moderate, increasing in more brittle rocks; Drillability 3-5		---	x	x	40-380	103	10-45	15		When used as fill, mica in weathered rock makes compaction to 95 percent difficult.
Gneiss & schist, typically massive & granitic in appearance 8	Forms rolling upland with steep-sided stream valleys.	Maximum 200' Average 50'	Overbreak mostly moderate; may be excessive depending on orientation of excavation to joints amo fractures. Rock loads slight toward shear zones; Drillability - 3		---	x	x	21-825	150	10-30	15	Highest median yields are in small valleys. Water commonly shallower than 50'. Joints & faults act as conduits. Maximum yields are related to major faults.	When used as fill, mica in weathered rock makes compaction to 95 percent difficult.
Volcanic rocks, commonly altered & slightly metamorphosed 3	Generally hilly, knobby terrain.	Maximum 150' Average 25'	Overbreak slight to moderate. Rock load mostly slight, increases near major faults. Thin dikes generally give moderate to extreme overbreak & rock loads. Generally very wet. Scaling excessive; Drillability-1		---	x	---	24-226	120	0.5-100	9	Water occurs in weathered zone, commonly shallower than 150'. Maximum yields from major fault zones.	
Slate 19	Rolling & hilly upland.	Less than 10'	Breaks easily; Drillability 6	Slippage along bedding plains is apt to give foundation problems	---	x	---	---	---	---	---	Water occurs only in fractures.	
TRIASSIC													
Red sandstone, shale, & conglomerate. 4	Broad basins with gentle sides; scattered low ridges & irregularly shaped hills with flat summits. Conglomerate caps more distinct hills & ridges.	Less than 10'	Overbreak & rock loads moderate to high. Rock loads excessive in wet zones. Wet squeezing ground in major fault zones. Shales slake breakdown in air. Excessive water occurs in zones below contact with basalt; Drillability 6		x	x	---	22-1,000	120	10-80	22	Water obtained from sandstone & conglomerate.	
Basaltic rocks 5	Forms low hills and ridges.	Less than 10'	Overbreak & rock loads mostly slight to moderate in large bodies; excessive in small sills & dikes. Rock locally in high state of stress. Excessive water in contact zone at base. Small wet seams of swelling ground probable. Altered & crushed zones may be stope badly; Drillability 1	Source of crushed rock. Some minerals harmful to concrete might be present. Weathered zone contains clay with high shrink-swell potential.	x	x	---	35-770	138	3-20	6		Poor source of water.

17

B

Table 6

SOILS OF THE WASHINGTON METROPOLITAN AREA: GENERAL INTERPRETATION*

I SOILS ON CRYSTALLINE ROCKS OF THE PIEDMONT PLATEAU

						SOIL FEATURES AFFECTING URBAN USE**				
MAP CODE	DOMINANT SOILS	PARENT MATERIALS	DEPTH TO ** BEDROCK	DRAINAGE ** CLASS	TOPOGRAPHY	SUITABILITY FOR SEPTIC SYSTEMS	SUITABILITY FOR SINGLE FAMILY DWELLINGS	SUITABILITY FOR HIGHWAYS	SUITABILITY FOR EXCAVATION	SUITABILITY FOR AGRICULTURE
1	Glenelg	Mica, Schist Gneiss	Moderately deep 3-10'	Well	Rolling upland	Good - poor on steep slopes	Good	Good	Good-bedrock hazard on steep slopes	Good; where slopes are not severe
	Manor	Mica, Schist	Deep 3-90'	Well to excessive	Rolling upland	Good - poor on steep slopes	Good	Good to fair stability	Good-bedrock hazard on steep slopes	Fair-good; shallow, sloping
	Elioak	Mica, Schist & Quartzite	Deep 4-30'	Well	Rolling upland	Fair - moderately slow permeability	Good	Good to fair stability	Good-bedrock hazard on steep slopes	Good; where slopes are not severe
	Chester	Mica, Schist Granitized Schist Granodiorite	Deep 5-20'	Well	Rolling upland	Very good; poor on steep slopes	Good	Good	Good-bedrock hazard on steep slopes	Very good
	Brandywine	Granodiorite	Shallow 0-8'	Excessive	Hilly - steep upland	Good - bedrock hazard poor on steep slopes	Good-bedrock shallow	Good-fair stability bedrock hazard	Poor bedrock hazard	Poor
2	Mt. Airy	Schistose Phyllite	Shallow 0-6'	Excessive	Rolling - steep upland	Poor - bedrock hazard	Good-bedrock shallow	Fair stability, bedrock hazard	Poor - 3' to bedrock	Fair - especially pasture-forage
	Linganore	Phyllitic Schist	Shallow 0-4'	Well-excessive	Upland ridges	Good-bedrock shallow	Good-bedrock shallow	Fair stability, bedrock hazard	Poor - shallow bedrock	Fair-poor
	Glenelg	Mica Schist-Gneiss	Moderately deep 3-10'	Well	Rolling upland	Good - poor on steep slopes	Good	Good	Good - bedrock hazard on steep slopes	Good - where slopes are not severe
3	Belvoir	Granodiorite	Deep 2-15'	Somewhat poor	Upland flats, drainageway heads	Very poor-pan, drainage	Poor - high water table	Poor-high water table	Poor - high water table	Poor
	Worsham	Acidic Rock	Deep 3-10'	Poor	Flat depressions drainageway heads	Very poor drainage	Poor-high water table	Poor-high water table	Poor - high water table	Poor
	Chester	Acidic Granodiorite	Moderately deep-Deep 5-20'	Well	Rolling upland	Very good - poor on steep slopes	Good	Good	Good - bedrock hazard on steep slopes	Very good
4	Conowingo	Serpentine	Shallow moderately deep 2-4'	Moderately well	Nearly level upland	Poor - slow permeability	Poor - subsoil shrinkage	Poor stability	Poor-bedrock hazard	Poor
	Aldino	Serpentine	Shallow moderately deep 2-6'	Somewhat poor - moderately well	Gently sloping uplands	Very poor-fragipan, bedrock	Moderate-high water table	Poor subgrade material	Poor-shallow to bedrock	Poor
	Iredell	Diabase	Shallow moderately deep 0-6'	Moderately well claypan	Gently sloping to rolling upland	Poor - slow permeability	Poor - subsoil shrinkage footing should be below subsoil	Poor; plastic clay shallow to bedrock	Poor-bedrock hazard unstable cuts	Fair
	Mecklenberg	Diabase	Shallow moderately deep 0-6'	Moderately well to well	Rolling upland	Poor - expanding clay	Fair-poor: all footing should be below subsoil	Poor-plastic clay shallow to bedrock	Poor-bedrock hazard unstable cuts	Fair
	Elbert	Syenite, Diabase	Moderately deep 2-10'	Poor	Upland flats	Poor; high water table	Poor - subsoil shrinkage high water table; footings should be below subsoil	Poor; high water table bedrock	Poor; bedrock, high water table	Poor
	Rockyland	Diabase, Syenite		-	Steep	Unsuited ⟶	⟶	⟶	⟶	
	Legore	Diabase, Syenite	Shallow 0-5'	Well-excessive	Hilly, steep upland	Marginal-bedrock	Good - bedrock hazard	Fair-bedrock hazard	Fair-bedrock hazard	Fair
	Montalto	Diabase, Syenite	Deep 0-7'	Well	Rolling upland	Good to marginal permeability	Good	Good to fair	Good-bedrock hazard on steeper slopes	Good

TABLE 6 (cont'd)

SOILS OF THE WASHINGTON METROPOLITAN AREA: GENERAL INTERPRETATION*
(continued)

II SOILS ON SANDSTONE, SHALE, AND CONGLOMERATE OF THE TRIASSIC LOWLAND

						SOIL FEATURES AFFECTING URBAN USE**				
MAP CODE	DOMINANT SOILS	PARENT MATERIALS	DEPTH TO** BEDROCK	DRAINAGE** CLASS	TOPOGRAPHY	SUITABILITY FOR SEPTIC SYSTEMS	SUITABILITY FOR SINGLE FAMILY DWELLINGS	SUITABILITY FOR HIGHWAYS	SUITABILITY FOR EXCAVATION	SUITABILITY FOR AGRICULTURE
11	Penn	Shale sandstone red Triassic	Shallow 0-6'	Well - excessive	Gently rolling Triassic upland	Marginal - shallow bedrock	Good - bedrock hazard	Fair - bedrock, fair stability	Fair - shallow bedrock	Fair
	Bucks	Sandstone, conglomerate shaly sandstone shale	Deep 2-5'	Well	Gently sloping Triassic	Good	Good	Fair - good - 5' to bedrock, good stability	Good	Fair - good
	Calverton	Shale sandstone	Deep 2-5'	Mod. well - somewhat poor	Depressions - upland flats	Poor - fragipan, high water table	Fair - high water table	Fair - seepage in cut slopes, bedrock hazard	Fair - bedrock hazard fragipan	Fair
	Lewisberry	Sandstone	Shallow	Excessive	Rolling to steep uplands	Marginal - bedrock	Good - bedrock	Fair - bedrock, fair stability	Fair - poor - bedrock	Fair - good
	Croton	Shale shaly	Deep 2-8'	Poor	Nearly level upland flats	Poor - high water table	Poor - high water table, plastic subsoil	Poor - poor drainage plastic clays	Fair - poor high water table	Poor
14	Beltsville	Silty mantle over old alluvium	Unconsolidated	Mod. well	Nearly level to gently undulating uplands	Poor - perched water table - slow permeability	Fair - periodic high water table, fragipan	Poor - unsuitable fill fragipan, seepage	Fair - fragipan	Fair
	Chillum	Moderately fine textured material	Unconsolidated	Well	Sloping	Marginal to poor - hard substratum	Good	Good stability	Good	Fair - good
	Leonardtown	Silty mantle over sandy, gravelly material	Unconsolidated	Poor	Nearly level	Poor - high water tables	Poor - high water table	Poor - high water table poor stability	Poor - high water table	Poor - fair
	Elkton	Silty clay sediments	Unconsolidated	Poor	Nearly level	Poor - high water table	Poor - high water table	Poor - high water table poor stability	Poor high water table	Fair
15	Christiana	Red clay	Unconsolidated	Well	Rolling uplands	Poor - slow permeability	Poor - high shrink-swell unstable clays	Poor - unstable clays	Poor unstable slopes	Fair
	Lunt	Marine sand, silt, clay	Unconsolidated	Well	High terraces, rolling	Marginal - variable permeability	Marginal - spread footings poor stability on slopes	Fair - material is variable	Good - marginal	Fair
	Beltsville	Silty mantle over old alluvium	Unconsolidated	Mod. well	Nearly level to gently undulating	Poor - perched water table - slow permeability	Fair - periodic high water table fragipan	Poor - unsuitable fill fragipan, seepage	Fair - fragipan	Fair
	Sunnyside	Fine sandy materials	Unconsolidated	Well	Level to steep good uplands		Good	Fair stability	Good	Fair - good
16	Collington	Sandy materials	Unconsolidated	Well	Rolling	Good	Good	Fair stability	Good	Fair - good
	Adelphia	Sandy materials with silt & clay	Unconsolidated	Mod. well	Gently sloping to level uplands	Poor - seasonally water table	Fair - high water table	Fair - seasonally high water table, poor stability	Fair - high water table, seasonally	Fair - good
	Monmouth	Clayey & sandy materials	Unconsolidated	Well	Nearly level to rolling	Poor - slow permeability	Good	Good	Good	Fair - good
	Matapeake	Silts over sand	Unconsolidated	Well	Gently rolling	Marginal - slow permeability	Good	Fair - good stability	Good	Good
	Galestown	Sands	Unconsolidated	Excessive	Level to steep	Good - marginal on slope due to well pollution hazard	Fair - loose sands	Fair stability	Fair - poor stability - loose sand	Fair - poor
17	Matapeake	Silts over sand	Unconsolidated	Well	Gently rolling	Marginal - slow permeability	Good	Fair - good stability	Good	Good
	Keyport	Fine silty clay	Unconsolidated	Mod. well	Level to gently sloping	Poor - high water table	Fair - high water table	Poor to fair stability	Fair stability	Fair - good
	Mattapex		Unconsolidated	Mod. well	Nearly level to undulating	Poor - high water table	Fair - high water table	Fair stability	Good to fair - water table	Fair - good
	Sassafras	Silty sand	Unconsolidated	Well	Undulating	Good	Good	Good	Good	Good
	Croom	Sandy, clayey gravel	Unconsolidated	Excessive	Sloping to very steep	Marginal - hard substrate	Good	Good	Good to fair - hard substratum	Poor - fair
18	Westphalia	Fine sand	Unconsolidated	Well	Nearly level to steep	Good	Good	Fair - poor stability	Good	Good
	Marr	Fine sand	Unconsolidated	Well	Nearly level to rolling	Good	Good	Fair stability	Good	Good - fair
	Howell	Silty materials	Unconsolidated	Well	Nearly level to steep	Poor - slow permeability	Fair - high shrink-swell potential	Poor - fair stability	Good	Good
	Evesboro	Sands	Unconsolidated	Excessive	Nearly level to fairly steep uplands	Good - risk of polluting nearby wells	Good - fair: loose sand	Fair stability, loose sand	Fair: loose sand	Poor
	Sassafras	Silty sand	Unconsolidated	Well	Undulating	Good	Good	Good	Good	Good
20	Bibb	Recent silty, sandy alluvium	Deep	Poor	Level flood plain	Subject to flooding →	→	→	→	
	Tidal Marsh	Sand to clay	to muck	Poor	Level - flooded with tide water					
	Huntington	Silt, sand clay alluvium	Deep 8-25'	Well	Level flood plain	Subject to flooding →	→	→	→	
	Chewacla	Micaceous gravelly silt loam	Deep 8-25'	Poor-mod. well	Level flood plain	Subject to flooding →	→	→	→	

SOILS FOOTNOTES

*Prepared for the Washington Metropolitan Council of Governments by F. R. Miller and J. E. Foss, Department of Agronomy, University of Maryland and the Maryland Agricultural Experiment Station in cooperation with the Virginia Polytechnic Institute Department of Agronomy and U.S.D.A. Soil Conservation Service.

**Quantifying terms are relative. The interpretation is suitable for general planning only.

II.D. HYDROLOGY.

1. General.

The Potentially Serviceable Area is comprised of three sub-major drainage basins: the Anacostia River, Henson Creek, and Piscataway Creek, all of which drain into the Potomac River. Maximum, low and average flows of these streams and the Potomac River at U.S. Geological Survey (U.S.G.S.) gauging stations in the Potomac Washington Metropolitan Region are shown in Table 7 below.

TABLE 7

FLOW DATA FOR STREAMS IN THE POTENTIALLY SERVICEABLE AREA (in cfs)

NAME	DRAINAGE AREA (sq. mi.)	HIGH	LOW	AVERAGE	LOCATION OF GAUGE
Anacostia River					
Northwest Branch	49.4	18,000**	.2	39.5	Hyattsville
Northeast Branch	72.8	10,600**	1.4	75.9	Riverdale
Beaverdam Branch	14.0	400	.2	12.26	
Piscataway Creek (Main Stem)	39.5	4,900**	.0	37.5	Piscataway
Henson Creek	16.7	3,340	.2	19	Oxon Hill
Potomac River (near (Washington)	11,560	484,000	121*	10,790	Washington, D.C.

*does not include diversion of 489 cfs for municipal use

**June 22, 1972

SOURCE: State of Maryland's Draft "Potomac-Metropolitan Area Basin Water Quality Management Plan", March 1974, and the U. S. Geological Survey.

NOTE: The high flows for the Beaverdam Branch, Henson Creek, and the Potomac River did not occur during the June, 1972 flood.

The Piscataway Creek Drainage Basin has a drainage area of 81.5 square miles and is located about 12 miles southeast of the center of Washington, D.C. Piscataway Creek flows in a westerly direction and enters the upper Potomac Estuary about 98 miles upstream from the Estuary's confluence with Chesapeake Bay. The Creek, except for the Bay segment, is small, sluggish, and is intermittent in the headwaters. Using the longer term records of Henson Creek, which has an average yield of 1.10 cubic feet per second (cfs) per square mile, the average annual flow from the entire Piscataway Creek Drainage Basin is estimated to be about 90 cfs (U.S. Department of the Interior "A Water Quality Study Report - Piscataway Creek Watershed").

Piscataway Creek discharges into Piscataway Bay and is the main source of fresh water for the Bay. The other source of consequences is the WSSC Piscataway Wastewater Treatment Facility, whose discharge affects the oxygen demand, nutrient levels, and mean flushing time of the Bay.

The following morphological and hydrographic data for Piscataway Bay from Jaworski and Johnson (1969)[1] was applied to the flushing model of Ayers (1956) as interpreted and modified by Bowden (1967).

Length: 2.6 miles
Mean depth: 4 feet (assumed mean low water)
Width: 2000 to 4000 feet
Surface area: 39,100,000 square feet
Tidal exchange: 93,840,000 cubic feet
Mean freshwater inflow: 90 cfs (7,776,000 cubic feet/day)

These data were combined with a 15 mgd effluent volume from the sewage treatment facility and flushing (hydraulic residence) times were calculated for the Bay. Mean low water volume of the Bay was assumed to be 156,400,000 cubic feet, and freshwater inflows from Piscataway Creek were varied from 60 to 120 cfs to assess the impact of runoff variations (Table 8). Jaworski and Johnson indicated that during a period of low freshwater runoff, the Bay flushed in approximately three weeks. U.S.G.S. flow data from Piscataway indicates that runoff during the dye survey was 9.6 percent mean flow. Application of this inflow plus 15 mgd from the sewage treatment plant provides a theoretical flushing time of 58.1 days. The discrepancy between the theoretical and actual flushing times arises from the inability to calculate the volume of water in Piscataway Bay which enters from the Potomac Estuary during the flooding period and remains during the ebbing period. During the dye survey this volume of water was approximately 97,860,400 cubic feet or 62 percent of the total volume of water in the Bay. Utilization of these data in the flushing calculations will shorten them substantially from the data presented in Table 8.

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[1] "Potomac-Piscataway Dye Releases and Wastewater Assimilation Studies" Norbert A. Jaworski and James H. Johnson, Jr., Technical Report No. 19, December 1969, FWPCA.

TABLE 8

FRESHWATER INFLOWS FROM PISCATAWAY CREEK

Source of Freshwater	Flow (cfs)	Flushing Time (days)
Piscataway	60	30.2
Creek	90	20.1
	120	15.1
Piscataway	83	21.7
Creek plus	113	16.0
15 MGD STPE*	143	12.6

*STPE = sewage treatment plant effluent

2. Water Quality.

a. Piscataway Creek.

Nutrient loading rates in Piscataway Creek shown in Table 9 below, were calculated from data collected by Jaworski and Johnson (1969) at four stations near the mouth of the Creek from July, 1968, through December, 1969. During these studies, the Creek's flow was approximately 65 percent of mean annual flow. Loading rates were calculated using mean concentrations of each variable and flows of 90 cfs and 59 cfs (65 percent of mean annual flow). Nutrient loads include the contribution from Tinkers Creek which joins Piscataway Creek downstream from the U.S.G.S. gauging station.

TABLE 9

LOADING RATES IN PISCATAWAY CREEK

Parameter Total	Mean Conc. (mg/l)	Maximum Conc. (mg/l)	Minimum Conc. (mg/l)	Loading Rates (lbs/day) 58cfs	Loading Rates (lbs/day) 90cfs
Phosphorus	0.326	0.650	0.157	116	158
TKN	1.076	3.138	0.241	331	521
NO_2 + NO_3	0.836	1.540	0.025	257	405
NH	0.115	0.260	0.018	35	56
DO	7.53	10.92	4.75	2319	3645
BOD	5.33	12.50	1.58	1642	2580
UOD	12.65	---	---	3918	6123

Pollutant loading of Piscataway Creek is primarily caused by sewage discharges from Andrews Air Force Base and the Naval Reservation. Andrews Air Force Base has two secondary sewage treatment facilities with capacities of 1.0 and 0.05 mgd. Both Air Force facilities discharge effluent into Tinkers Creek. The approximate loading rates of the facilities, calculated from data provided by the Air Force, are listed in Table 10. Effluent from the Air Force Base constitutes the following percentage of the total loads discharged from Piscataway Creek at 59 cfs: flow 1.8 percent, phosphorus 48.2 percent, nitrate-nitrogen 11.7 percent, and BOD 10.9 percent. Effluent from the Naval Reservation averages 50,000 gallons per day and is similar in quality to the wastewater discharged from the larger Andrews plants.

TABLE 10

LOADING RATES OF ANDREWS AIR FORCE BASE FACILITIES

Parameter	Loading Rate (lbs/day)		TOTAL
	Plant #1	Plant #4	
Phosphorus (p)	53	3	56
No_3-N	30	.2	30.2
BOD	167	12	189
Flow (MGD)	1.0	.05	1.05

b. Piscataway Bay.

Present nutrient loading of Piscataway Bay originates from the Piscataway Wastewater Treatment Facility and Piscataway Creek, but the primary nutrient load appears to originate from the adjoining Potomac Estuary.

EPA water-quality data for Piscataway Bay show mean concentrations and total loads of various constituents and are shown in Table 11.

Approximately 73 percent of all chlorophyll readings in the Bay during 1968-69 exceeded the 25 ug/l maximum recommended by Jaworski, Clark and Feigner (1971). Of these observations, 45 percent exceeded 100 ug/l and 11 percent exceeded 200 ug/l.

Although the water quality in the upper reaches of Piscataway Bay is degraded by the discharge of the Piscataway Wastewater Treatment Facility, the water quality of the lower portion of Piscataway Bay is dependent on the quality of water in the mainstem of the Potomac River.

TABLE 11

MEAN CONCENTRATIONS AND TOTAL LOADS

PISCATAWAY BAY

Parameters	Mean Conc. (mg/l)	Total Load (lbs.
Total PO_4	1.799	17,414
TKN	2.294	22,206
NH_3 -N	0.638	6,176
(NO_2+NO_3)-N	0.848	8,209
BOD	10.78	104,350
UOD	25.42	246,065
DO	8.25	79,860

c. Potomac River Estuary.

The average annual discharge rate of the Potomac River at Great Falls is 10,780 cfs with a minimum of 610 cfs and a maximum of over 484,000 cfs. Effluents from the 18 major wastewater treatment facilities and combined sewer overflows, with a total flow of 325 mgd, contribute 450,000, 24,000 and 60,000 pounds per day of ultimate oxygen demand (UOD), phosphorous, and nitrogen respectively to the waters of the upper Potomac Estuary. These effluents constitute the major sources of nutrients and UOD in the Potomac Estuary.

Appendix H is a summary and conclusion of EPA's Technical Report #35 ("Water Resources - Water Supply Study of the Potomac Estuary") and should be referred to for detailed information on the water quality of the Potomac Estuary.

All of this data indicates that Piscataway Bay, as well as the Potomac Estuary are relatively polluted, with high nutrient levels in the area of their confluence. The hydraulics of the tidal action opposing the inflow of fresh water from Piscataway Creek serve to transport nutrients from the Estuary into the Bay.

d. Anacostia River[1].

The Anacostia Drainage Basin drains most of the suburban area located northeast of the District of Columbia. Although the State of Maryland has limited data on the Anacostia, extensive sampling work has been done by the Montgomery County Department of Environmental Protection, United States Geological Survey, Washington, D.C. Department of Environmental Services and the U.S. Environmental Protection Agency. Parameters sampled include pH, dissolved oxygen, water temperature, turbidity, biochemical oxygen demand, nitrite plus nitrate nitrogen, total phosphate, fecal coliforms and total coliforms.

Throughout the Anacostia Basin, Maryland standards for fecal coliform densities are exceeded. Specific problem areas include the upper reaches of the Northwest Branch and Paint Branch where failing septic systems result in excessive E. coli populations. In the tidal portion of the Anacostia, storm water runoff accompanied by periodic sewer overflows results in bacteria concentrations that constitute a major health hazard. Mean values for dissolved oxygen in excess of 5.0 mg/l are maintained throughout the Anacostia upstream from the District of Columbia. Mean dissolved oxygen values of less than 5.0 mg/l were reported at sampling locations within the District of Columbia during the months of July, August, and September 1971.

The major industrial user of the Anacostia River is the Potomac Electric Power Company (PEPCO). Over 1,000 mgd of cooling water is discharged from the operation of PEPCO's two generating stations. Others include sand and gravel operations, the Naval Ordinance Laboratory-White Oak and Mineral Pigments Corporation. The latter is currently operating under a consent decree to improve the quality of wastewater discharged to a tributary of Indian Creek.

Nutrient data for nitrite-nitrate nitrogen indicates average values of 1.6 mg/l in the Maryland portion of the Anacostia. Total phosphate values averaged 0.20 mg/l for the 1971-1972 period. Preliminary studies suggest that sediment loading is the probable limiting factor with regard to algal blooms in the Anacostia.

Sediment problems plague much of the Anacostia Basin. Extensive residential construction centered in the upper watershed has resulted in extensive stream bank erosion and runoff during periods of heavy rainfall. Samples taken from Bel Pre Creek upstream from the confluence with the Northwest Branch show high concentrations of suspended solids due to construction activities.

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[1] Taken from the State of Maryland's Draft Potomac - Metropolitan Area Basin Water Quality Management Plan, March, 1974.

Similar data were obtained in the Northwest Branch between Hyattsville and Colesville. Land use in the Northeast Branch includes well-managed forest and farmlands owned by the U.S. Department of Agriculture. Accordingly, sediment loading from the larger Northeast portion of the watershed is less than the sediment volume contributed by the smaller, yet more heavily urbanized, drainage area of the Northwest Branch.

3. Water Supply.

The Washington Suburban Sanitary Commission is the major water supply agency for Prince George's and Montgomery Counties. The principal sources of raw water for this system are the Potomac and Patuxent Rivers whose waters are treated at separate water treatment plants. The Potomac River Water Filtration Plant is located on the Potomac River near Watts Branch and has a nominal capacity of 160 mgd and a peak capacity of 240 mgd. Current improvements are being accomplished so as to develop an ultimate capacity of 400 mgd, in the expectation that proposed upstream reservoirs will be constructed to permit withdrawal at that rate.

The Patuxent Water Filtration Plant is located near Laurel, Maryland, and is fed by two reservoirs which have been constructed in series upstream of the plant. These reservoirs provide 13 billion gallons of storage and have a safe average annual yield of 43 mgd with a peak capacity of 65 mgd.

The ability of the unregulated Potomac River to meet not only future, but even present water supply needs in the Washington Metropolitan Area is critical. This ability depends largely on the low flows of the Potomac River. Appendix E contains projected water needs for this area as reported in Technical Report #35. In addition, Table 12 presents the projected water supply demands for the Washington, D.C. SMSA. These were taken from a preliminary report on alternative water supply programs for the Metropolitan Washington Area prepared by the Department of the Army, North Atlantic Division, Northeastern United States Water Supply Study (NEWS), April 1974. These projections indicate that even with the proposed additional water supply reservoirs, large withdrawals from the rivers will be required.

The unregulated Potomac River cannot be depended upon for more than 374 mgd as a water supply. Public groundwater supplies provide a very small percentage of the water currently consumed in the metropolitan region. However, there is a good potential for increased utilization of groundwater supply, and as Figure 14 indicates, this potential is greatest in the Coastal Plain area. The crystalline rocks of Prince George's County are underlain by unconsolidated sediments of the Coastal Plain and these sediments increase in thickness from a few feet at the Fall Line (western boundary of the Coastal Plain), to several thousands of feet under Chesapeake Bay. This is illustrated in Figure 15.

TABLE 12

METROPOLITAN WASHINGTON AREA WATER DEMAND PROJECTIONS*
1980 - 2020
(MGD)

	CHARLES COUNTY[1]	CORPS (BEA)[2]	MWCOG[3]	NEWS BASELINE[4]
1980	10	450	510	520
1990	10	600	620	630
2000	15	750	630	745
2010	20	925	635	860
2020	25	1100	645	970

*Annual average. All figures rounded off to nearest 5 MGD.

[1] NEWS Study. No increase is shown between 1980 and 1990 due to rounding.

[2] Corps Interim Report, Vol II, May 1973, Table III p. 11; linear interpolation for 1990, 2010, excludes Charles County.

[3] Estimate from Metropolitan Washington Council of Governments' Framework Water Resources Planning Model based on EMPIRIC, Alternative 6.2 modified, "Local Perspective;" linear interpolation and extrapolation of all years, excludes Charles County.

[4] Sum of Charles County and MWCOG. The NEWS Baseline refers to the projections that are utilized in the planning efforts.

4. Water Quality Standards.

The State of Maryland has developed an effective program to improve water quality in the State. Pursuant to Federal Directives implementing the Federal Water Pollution Control Act Amendments of 1972, the State of Maryland has undertaken the following:

a. Revision of the water quality standards and related water pollution control regulations. These revisions have been approved by EPA and are the basis for Maryland's water pollution control program.

b. Submitted a State Continuing Planning Process (CPP) to EPA that outlined problem areas, described subsequent basin plan composition, and prescribed a division of labor for the development of these plans. This CPP was approved by EPA.

c. The CPP called for the June 30, 1973 submission of a Draft River Basin Plan for the Potomac-Metropolitan Area (02-14-02). The Piscataway Creek Basin is included in this plan. An updated Draft River Basin Plan has been submitted and the Final Plan has been delayed.

d. This segment of the Potomac River has been given the highest priority ranking in the State. This means, this segment will receive a very high priority for Federal assistance for the construction of municipal wastewater treatment facilities. The 1975 Project List for Federal assistance for the construction of municipal wastewater treatment facilities indicates that the proposed nutrient removal facilities and outfall pipeline are ranked number 2 and 6 respectively.

II.E. BIOLOGY.

1. Vegetation.

The vegetative cover of the Potentially Serviceable Area, prior to urban development, was dense hardwood forests made up of predominantly oaks; however, hickory, maple, yellow poplar, dogwood, and sweetgum were also present. The onslaught of man, cutting and clearing of forested land, increased development and eventual urbanization over the past several decades has allowed coniferous species such as Virginia, shortleaf, and loblolly pines to establish-in addition to sumacs, persimmon and locust. Of more significance, however, has been the loss of forested acreage. Presently, less than 12 percent of Montgomery County and approximately 60 percent of Prince George's County remains forested and increasing development pressures are continuing.

The area which would be directly affected by the construction of the proposed AWT additions is relatively flat to gently rolling grassland with scattered sapling sand underbrush (Photo 12). The area is relatively unwooded except for a grove of trees, predominantly sycamores, averaging 30 feet in height, covering an area approximately 500 feet by 250 feet. Trees also border a small creek which passes through the property. These trees border the creek for approximately

1000 feet, and the width of the wooded area varies from 30 to 50 feet. This area is also densely covered with underbrush. Some saplings and underbrush follow a 500-foot fenceline running east to west in a southern sector of the property. A detailed survey of the trees on the site was not initiated; however, a comprehensive tree survey for the proposed 108-inch effluent conduit to the Potomac Estuary was done by WAPORA, Inc. for WSSC and is included in Appendix D as Table D1. The trees listed in Table D1 may be included in the vegetation on the site and is very representative of the area. Throughout the area surveyed, oak and sweetgum are the most abundant trees. Persimmons and black locust are also common.

Understory vegetation in the area includes immature trees and greenbriers (*Similax* sp.), blackberries (*Rubus* sp.), honeysuckles (*Lonicera vaponica*) and poison ivy (*Rhus Padicans*). A few sumacs (*Rhus* sp.), alders (*Alnus* sp), hollys (*Ilex verticillata*), viburnums (*Viburnum* sp.), elder berries (*Sumbucus canadeusis*) and grapevine (*Vitus* sp.) were also encountered, but most of the underbrush was composed of nuisance species such as greenbrier and honeysuckle. Within the WSSC property, underbrush is concentrated along the previously mentioned creek and fenceline.

The area which would directly be affected by the construction of the proposed 108-inch effluent line can be broadly characterized as typical undeveloped scrub woodlands except those areas that have been cleared and cultivated as pasture land or for the growth of crops such as corn, beans and tobacco (see Figure 6). The wooded sections are largely covered with second-growth trees and shrubs. The largest arboreal species noted were sycamores (*Platanus occidentalis*) of approximately 24-inches-diameter at breast high (DBH) and 40 feet tall. Some of the woodlands are apparently used as pasturage and little or no understory species other than red cedar (*Juniperus virginiana*) were seen. In non-pastured woods the dense undergrowth was frequently dominated by greenbrier (*Smilax* sp.), wild rose (*Rosa* sp.) and honeysuckle (*Lonicera* sp.).

The wooded sections represent 7 acres or less of the 19 to 20 acres of land included in the right-of-way for the proposed pipeline. The remainder of the land affected is presently fallow or in crops or pasturage. The topography in these sections is essentially similar throughout in that it is gently rolling land, sloping toward the Piscataway Bay to the north and the Potomac River to the west. Two stands of trees, composed largely of second-growth, even-aged oaks (*Quercus* sp.) and maples (*Acer* sp.) of about 1-foot DBH and 35 feet tall, would be bisected by the proposed action. A more detailed description of this area is presented in Appendix J, prepared by National Capital Parks, National Parks Service.

The upper part of Piscataway Bay is a tidal marsh with abundant growths of submerged and emergent aquatic plants (see Photos 8, 9, and 10). The majority of the aquatic vegetation is reed grass, Phyragmites and Pontederia cordata, cattails, wildrice, spatterdock, waterlilies, and coontails, Cereatophyllerm.

2. Wildlife.

Although urban development has diminished nesting and feeding areas, the Potentially Serviceable Area still supports high populations of ducks and a variety of shorebirds in addition to small populations of Canadian geese, herons, and swans in the estuarine areas.

Wildlife not directly water-oriented such as quail, dove, squirrel and raccoon have not been seriously affected by degraded water quality; however, urban development has reduced the amount of habitat, thus reducing their numbers.

Mink, otter, and muskrat have been adversely affected by the degraded water quality and the increase in human population. Whitetail deer is the only big game species inhabiting the area, and hawks, crows and a variety of songbirds and small rodents are abundant.

The endangered Southern bald eagle has been observed downstream in the lower Potomac Estuary, despite its rapid decline as a result of increased human population in the primary nesting areas, loss of nesting trees, disturbance of nesting birds, illegal shootings, and possible reduced reproduction due to pesticides.

The species of birds which may winter or breed in this area are listed in Tables D2 and D3 respectively in Appendix D. These lists were compiled by WAPORA for WSSC under the following conditions: For Table D2, the species is known to occasionally winter in the Coastal Plain along the Potomac shoreline of Maryland; furthermore, the Piscataway Bay area supplies a habitat preferred by these species. The list in Table D3 is restricted to species known to nest in the Coastal Plain along the Maryland shore of the Potomac River, and is further limited by the habitat in the Piscataway Bay area. The Piscataway Bay provides a sheltered area for waterfowl, and the cattail marsh which extends well up into the upper reaches of the Bay, provides nesting sites and food for many birds. Marshes support 15 or 20 birds per acre, and are of immense importance in the ornithological field. Marshes are necessary for the preservation of many bird species, but so many have been drained that the long-range future for many waterfowl and related species is questionable. Over 40 percent of the marshes in the United States have already been drained; over the same period of time the duck population has decreased 90 percent. Thus, every marsh becomes valuable. Of the 37 species of waterfowl which may winter on Piscataway Bay and/or feed in the marsh, 11 species (more than 115 birds) were sighted from the shore on March 1, 1972 (Appendix D Table D4). These figures show that the Bay and its marshes are, as expected, highly attractive to wintering birds. A further discussion of the wildlife in Piscataway Bay is presented in Appendix J.

At present, the habitat for land birds in the Bay area is highly varied, and even includes a small residential area. There are several woods which range from scrub to stands of sycamore and spruce with particularly fine specimens of holly trees (25 feet high and a foot in diameter). These woods have a generous supply of underbrush consisting of wildrose, greenbrier and honeysuckle. Much of the land in this area is farmland providing cultivated fields and pastures; many of the latter include cedar trees.

Such a varied environment attracts so many species that the available food becomes the limiting factor. The area covered by a bird in search of food depends on whether the bird is wintering or nesting. During the nesting season, the food is comparatively concentrated and the range is restricted to a few hundred yards for most species; during the winter, birds may travel miles to obtain sufficient food.

3. Fish.

In addition to being a great recreational fishing area, a substantial commercial fishery exists in many areas of the Chesapeake Bay and its tributaries. According to data received from the U.S. Department of Commerce, the 1966-1970 average annual fishery harvest for Chesapeake Bay and its tributaries (except the Susquehanna River Basin) was 388,503,000 pounds of finfish and shellfish, which was valued at approximately $32,638,000. However, estuarine - dependent commercial fisheries are constantly being threatened by reduction in important nursery and spawning habitat, pollution, change of environment due to altered flows from tributaries, blockage of anadromous runs, and even over-exploitation of the resource. The fishery resources of the Potentially Serviceable Area have been more seriously affected by degraded water quality. In addition, a study of the Anacostia River showed that more than 20 species of fish have been eliminated from the river since 1949.

Approximately 23 species of fish occur in Piscataway Creek upstream from the Piscataway Wastewater Treatment Facility and are listed in Appendix D, Table D5, as compiled by WAPORA for WSSC. Nine of these species may also enter Piscataway Bay and are noted by the designation (PB) following their common name. Anadromous fish found in Piscataway Creek are listed in Appendix D, Table D6, and was also compiled by WAPORA for WSSC. Endangered fish species, as determined by Miller, 1972, which have been found in Piscataway Creek include the Tosyside dace (rare) and the Cutlips minnow (depleted). Carp has been regarded as the only commercially important fish in Piscataway Bay.

Fishes of the lower Potomac Estuary are listed in Appendix D, Table D7 (WAPORA) and has been amended by the U.S. Department of Commerce to more clearly identify those fish species of commercial or recreational value. The fish included in this list may not necessarily be present in Piscataway Bay. Diversity is generally reduced under stress imposed by organic pollution (Mackenthun, 1969), and the presence of most of these fishes in Piscataway Bay is doubtful. Unfortunately, surveys of the fishes in the Bay have not accompanied water-quality studies and verification of the actual fish community structure is not possible.

In addition, portions of the upper Potomac serve as spawning and/or nursery areas for such important commercial and sport species as American Shad, bluback herring, white perch, alewife, striped bass, American eel, and Atlantic menhaden.

Data concerning the benthic community in Piscataway Bay are also unavailable. Scattered information from several WAPORA surveys in the vicinity of Piscataway Bay provided some data concerning general benthic community structure. In the area near Craney Island and near Mount Vernon, the benthic community was dominated by Tubifex sp. and Chironoma sp. (WAPORA, 1971, 1972). The Craney Island area was also inhabited by insect larvae (Diptera) and snails and clams (mollusca), with less than 5 percent of the molluscs being alive at the time of capture (WAPORA, 1971). In Mattawoman Creek, Tubifex sp. were found to decrease with distance upstream from the Potomac River; insect larvae, segmented worms, and leeches were also found in the same region (WAPORA 1971). This information indicates that the benthic community in the Potomac Estuary and many of its tributaries is dominated by the "polluted water association" organisms (Mackenthun, 1969) which are listed in Appendix D, Table D8.

It is reasonable to expect a similar distribution of organisms in Piscataway Bay, since prior studies have shown it to be somewhat polluted.

II.F. AESTHETICS, RECREATION AND HISTORY[1].

The Piscataway facility's location, near the eastern edge of Piscataway Bay, is surrounded by natural beauty. The immediate surrounding area has not yet been overtaken by suburban development from the north, and the topography, bay and river create visual and audial tranquility. Figure 6 is a recent aerial potograph depicting the facility site, Piscataway Park (under which the proposed effluent outfall will run) and Bay, and the several nearby historical and recreational places. The following paragraphs identify these important places. Of these, Piscataway Park, Fort Washington, and Mount Vernon are listed on the National Register of Historic Places.

Piscataway Park: This park was created by Congress in 1961, for the purpose of preserving the view from Mount Vernon. At present, development of the Park is minimal, and there are no plans for further development in the immediate future. However, during the next thirty to fifty years the park will be developed as a limited recreation facility. Piscataway Bay, a shallow estuary of Piscataway Creek, stretches the entire length of the park, providing 800 acres of open water. The Bay has considerable aesthetic and recreational value as an adjunct to the park.

Mount Vernon: The restored estate of George Washington is located 2½ miles downstream from the proposed outfall. It is open for tourists all year, and is visited annually by an average of one and a quarter million people, with the heaviest traffic during the spring and summer months.

Fort Washington: This 341 acre park is located on the north bank of the Piscataway Bay and east bank of the Potomac River, about a mile upstream from the proposed point of effluent discharge. The park includes the old fortifications, an extensive picnic area and a scenic outlook to the river. In 1972, almost half a million visitors used the park, primarily from May to August.

Fort Hunt: This park is near Mount Vernon, lying west of the George Washington Parkway. Because the Parkway is of higher elevation, the river is not visible from the Park. There are a pavillion and five picnic areas which annually accommodate almost one-half million visitors, primarily from May to August.

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[1] The information in this section is derived from an Environmental Assessment prepared by National Capital Parks, National Park Service, "Proposed 108" Effluent Conduit Across Piscataway Park, Maryland." This statement is reproduced in its entirety as Appendix J.

The National Colonial Farm: This farm is on the southern end of Piscataway Park and is operated by the Accokeek Foundation under a permit from the National Park Service. The farm is devoted to the maintenance of crops and conditions of mid-18th century and is landscaped and extensively cultivated.

Archeological Sites: The lands surrounding Piscataway Bay are considered one of the most important sources of archeological material for the pre-history of the Middle Atlantic area. Excavations made during the 1930's provide the story of 5,000 years of native occupation by seven distinct cultures:[1] Archaic period (Archaic people), 3000 B.C. to 500 B.C.; Early Woodland period (Marcey Creek and Pope's Creek peoples), 1200 to 1600; Colonial period (white people), 1600 to 1776; and American period, 1776 to present. It is interesting that during the American period, the area has remained consistently free from commercial and industrial development, consisting of small farms and estates. Population and recreation pressures of recent origin will make it increasingly difficult to retain the rural setting which has always existed. Pages 14 through 16 in Appendix J summarize the colonial history of the area; the map presents the archeological and historical sites which have been discovered in the vicinity of Piscataway Park. In addition, the letter from the Maryland Historical Trust which indicates other specific sites is attached to Appendix J. There are undoubtedly a large number of sites, particularly near the Bay, which have not yet been identified.

II.G. STATUS OF COMPREHENSIVE PLANNING AND LAND USE IN THE POTENTIALLY SERVICEABLE AREA.

Because of its location in a major metropolitan area, there are a large number of general and special-purpose public agencies with planning responsibilities in the Potentially Serviceable Area. This and the following section identify those local agencies which have key roles in comprehensive and wastewater management planning, and discuss the current status of land use plans and population projections. Specific wastewater project plans related to the proposed Piscataway Facility are outlined in Section I.F.

1. Regional Development Planning[2].

The Metropolitan Washington Council of Governments (COG) is the regional comprehensive planning agency, whose responsibilities include regional guidance[1] for land use, water supply and wastewater treatment, transportation, and housing. Additionally, COG has been designated by the Office of Management and Budget as the Metropolitan Clearinghouse (A-95 Agency) for the review of all local applications for Federal grants.

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[1] An interpretation of the pre-historic occupation is contained in the Prehistoric People of Accokeek Creek, by Robert L. Stephenson,

[2] The information in this section is derived primarily from COG's Water and Sewerage Plan and Program: 1971-1972, pp. II-1 through II-31.

In 1964 COG adopted the regional development policy which exists to this day. Based on the National Capital Planning Commission's "A Policy Plan for the Year 2000: The Nation's Capital", the policy identifies several development corridors which radiate from the District of Columbia into suburban Maryland and Virginia (see Figure 16).

One of the development corridors is contained, in part, in the Piscataway Design Service Area; two others are partially within the proposed facility's Potentially Serviceable Area. Effective implementation of the policy will consist of actions taken, over many years, by local, county, state and Federal agencies regarding land use and construction controls (including New Town development), transportation, facility siting and, of course, utility location and capacity.

2. Subregional General Planning.

The Maryland-National Capital Park and Planning Commission (M-NCPPC) conducts comprehensive planning for Prince George's and Montgomery Counties in suburban Maryland. Separate planning offices exist for each county, under the direction of the Commission.

The current bi-county general plan ("...on wedges and corridors") was adopted in 1964 and provides considerably greater detail than the COG scheme. Since 1964 several subregional master plans have been adopted by M-NCPPC, including one for Piscataway Creek Vicinity.[2]

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[1] COG, as a regional planning agency, provides guidance to other agencies. However, implementation authority lies with the local governments and special purpose authorities.

[2] The most recent overall revision to the M-NCPPC General Plan was published in 1969, and is available for review at the Commission Offices in Riverdale and Silver Spring. Subregional plans are similarly available, although these have not yet been reflected on a published bi-county plan.

A salient feature of recent M-NCPPC planning in Prince George's County is the desire for a more coordinated staging of private development and public investment.[1] The need for this coordination has become clear during the past several years, during which the largely-uncontrolled residential development outpaced economic (i.e., industrial) growth as well as the ability to provide timely public capital improvements. One obvious result of this inbalance is the current sewer moratorium in much of the bi-county region.[2,3]

Figure 17 identifies the areas of Prince George's County which have been proposed for preferred, limited or deferred development. General definitions of these areas are as follows:[4]

a. Preferred Development Areas.

Areas suitable for potential major economic development and for the majority of new residential development during the staging period. Suitability characteristics include:

(1) Unused capacities in existing and programmed public facilities;

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[1] For a thorough discussion of this planning concept, refer to M-NCPPC's "Proposed Staging Policy Prince George's County Council, This study was requested by the Prince George's County Council, but as of this date has not been adopted. Although a portion of the Potential Service Area is in Montgomery County (see Figure 3), the staging analysis is not presently available for this area. Recitation of M-NCPPC land use planning goals in this EIS does not necessarily constitute an endorsement by the Environmental Protection Agency.

[2] Section IV.B. elaborates on the socio-economic aspects of the moratorium.

[3] In conjunction with the development of staging policies in the bi-county area, both Counties have or soon will, adopt an adequacy-of-public-facilities test for the review of subdivision applications Part I, Section 2, of the State of Maryland's Draft "Potomac-Metropolitan Area Basin Water Quality Management Plan", March 1974 contains a summary of these recent ordinance changes.

[4] M-NCPPC "Proposed Staging Policy...", pp. 16-18. An additional category-economic potential areas - is also discussed but has been included in the preferred category in Figure 17.

(2) Location within the General Plan's radial corridors;

(3) Location convenient to the METRO system; and

(4) Ability to attract development with a balanced economic mix, including new towns and communities with varied employment opportunities.

b. Limited Development Areas.

Areas of limited additional population growth, including vacant land in existing developed areas and recorded subdivisions that have received prior sewer commitments from WSSC. Additionally, limited development is proposed for areas where existing or programmed public facility capacities are generally insufficient to accommodate large-scale residential growth.

c. Deferred Development Areas.

Areas predominately rural and undeveloped, which lack the necessary public facilities to support urban development. These areas, which include the largest portion of the County, are proposed to be withheld from all but very low density development during the ten-year staging period.

It can be seen in Figure 3 that the Design Service Area is roughly equally divided among the three staging categories. However, the additional area which constitutes the Potentially Serviceable Area is largely proposed for limited development. It is important to note that the proposed staging policy in Prince George's County is generally consistent with COG's analysis of the SMSA's recent land use trends (see Figure 18), as well as with the regional guideline to consolidate urban development to the greatest extent possible. Toward this end, capital improvement priorities will be given to areas which are already mature or developing, but which have deficiencies in public service facilties.

3. Water and Sewer Planning.

The Maryland State Water and Sewer Planning Law requires Prince George's and Montgomery Counties, along with the Washington Suburban Sanitary Commission to develop a statement of "goals, purposes and concepts" for use in the preparation of the "Ten Year Water and Sewer Plan and Six Year Capital Improvement Program."[1]

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[1] In Prince George's County, this goal-setting process has expanded from its required focus on water and sewer planning to the development of a comprehensive set of County goals, on an annual basis.

After approval at the County level, the Plan and Program is used by the State in its identification of funding priorities.

Thus, within the Ten Year Plan, five areas are delineated:

a. Areas currently served,

b. Areas for which facilities are either under construction or in final planning,

c. Areas for which facility construction should be given priority,

d. Areas for which facilities are needed within ten years, and

e. Areas for which facilities are not foreseeable in ten years.

With this delineation, areas for public facilities, on-site septic systems, and interim septic systems are identified in a ten-year planning period. The "Ten Year Plan and Six Year Program" are compatible with the development staging being done at the County level; in effect, the provision of water and sewer facilities has become one of the key policy variables used to implement agreed-on development goals.

4. Land Use Patterns.

There are no maps available for the Potentially Serviceable Area which depict, in detail, current land use. Figure 18 above is a schematic representation of the gross development densities for the SMSA. As mentioned previously, three of the COG-designated radial development corridors traverse, in part, the Piscataway Potentially Serviceable Area. What follows is a brief overview of current land use.

Suburban Washington, on both sides of the Potomac River, is overwhelmingly residential. The metropolitan area is unusually devoid of industrial (i.e., manufacturing) establishments, and, as one would expect, heavily represented by institutional and governmental land use and employment. For example, Table 13 presents SMSA employment figures for 1969, which depicts selected non-government industrial breakdown.

TABLE 13

1969 EMPLOYMENT, SELECTED INDUSTRIAL CLASSIFICATIONS
WASHINGTON, D.C. SMSA AND MARYLAND PORTION[2]

Industrial Classification	SMSA	Maryland Portion
Manufacturing	57,656	19,969
Wholesale Trade	42,741	10,087
Retail Trade	178,530	67,176
Finance, Insurance, Real Estate	65,336	17,171
Services	220,613	53,035
Contract Construction	62,468	23,104

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[1] Plans for future expansion of the Piscataway and related facilities are discussed earlier in Section I.F.

[2] Source: U.S. Department of Commerce, Census Bureau, "County Business Patterns, 1969" above figures are only for 1-digit SIC detail.

Manufacturing establishments within the Potentially Serviceable Area are concentrated in the Anacostia area, primarily due to the Penn-Central, Baltimore and Ohio Railway Lines. The M-NCPPC General Plan indicates that this concentration will persist into the foreseeable future.

Within Prince George's County, slightly more than half of the current households reside in multi-family units, although land area devoted to single-family units is much greater. Within the Design Service Area alone, there is very little multi-family housing. However, the Adopted Master Plan for Prince George's Subregion V calls for cluster development and some New Town centers within the Design Service Area. The Anacostia portion of the Potentially Serviceable Area - in both Montgomery and Prince George's Counties - is already suburban in character and will not likely experience a substantial change in the land use pattern which already exists.

II.H. POPULATION AND WASTEWATER DISTRIBUTION AND PROJECTIONS.

Two basic imputs to the land use and wastewater treatment planning process are population growth (or decline) and its distribution within the study area.[1] During recent years, several attempts have been made to forecast population for the SMSA and for the various sub-regions within the SMSA. For the purposes of this Environmental Impact Statement, the most recent estimates available from M-NCPPC are used[2] regardless of the source. It is well known that almost all population growth in the SMSA is and will be occurring in the suburban counties, where lands conducive to development exist. Table 14 is a compilation of population estimates for the Design and Potentially Serviceable Areas of the Piscataway Facility for the years 1972, 1982, 1992, 2000, and for full development.

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[1] In recent years, regional planners have begun to consider population as a control variable itself. Planning is a complex process, involving estimates of both supply and demand variables, as well as political expectations. Population is a key ingredient of the demand side of the total picture, and complements estimates of regional income and income distribution.

[2] Although many different population forecasts are available for the study area, the M-NCPPC figures were chosen because (a) these are the estimtes used by WSSC in their planning, (b) these figures are not significantly different from the latest available at COG and the State, and (c) they are conveniently disaggregated by drainage areas.

TABLE 14

POPULATION ESTIMATES, PISCATAWAY DESIGN AND POTENTIALLY SERVICEABLE AREAS, FOR SELECTED YEARS

Sewer Service Area	1972	1982	1992	2000	Ultimate
Piscataway	55,700	69,600	107,000	137,600	310,300
Henson Creek	62,200	78,200	93,500	105,400	156,500
Carey Branch	7,900	8,000	14,700	15,000	20,300
TOTAL DESIGN SERVICE AREA	125,800	155,800	215,200	250,000	487,100
Anacostia (P.G. CO.)	321,300	345,300	421,200	463,200	521,500
Anacostia (Mont. Co.)[1]	159,780	195,620	208,200	215,000	259,200
TOTAL POTENTIAL ADDITION	481,080	540,920	629,400	678,200	780,700
TOTAL POTENTIALLY SERVICEABLE AREA[2]	606,880	696,720	844,600	936,200	1,267,800

[1] NOTES: Figures for Montgomery County portion of Anacostia area from M-NCPPC, approved by Montgomery County Planning Board in June 1972. These figures were tabulated for 1970, 1980, 1990, and 2000; proportional interpolation used here to estimate populations for the selected years. All other figures are from M-NCPPC, Prince George's County Planning Board, dated May 1973.

[2] Summation of population in Design Service Area and in Anacostia Area. See Section I.A. and Figure 3 for definition of these area boundaries.

It is noteworthy that the M-NCPPC figures for Prince George's County indicate a county-wide increase of 140,000 for the period 1972 to 1982, an annual average increase of 14,000. This is significantly lower than experience would indicate to be likely. From information presented in the "Proposed Staging Policy...," however, it appears that a 1972-1982 population growth of 140,000 is as much an expression of County goals as it is of independent forecasting.[1] The concept of an optimum rate of population growth - one that is "in balance" with other economic indicators (e.g., employment, income, tax base), is introduced as an adjunct to public investment priorities in promoting orderly development and land use. Whether such target growth rates become reality is an issue which can only be speculated about at present. Section IV.B. elaborates on the socioeconomic aspects of such goals.

Projected wastewater flows corresponding to the population projections from Table 14 are presented in Table 14A. Two flow projections are presented for each selected year. The first figure was determined by using 125 gallons per person per day. The second Figure represents WSSC's projection which is based on 100 gallons per person per day plus 200 gallons per day per acre of service area (for infiltration) plus an estimate of commercial and industrial contributions. The major difference between the flow projections appears to be WSSC's estimate of commercial and industrial flows. In most cases the projected flow of 125 gallons per person per day is approximately equal to WSSC's estimate minus projected industrial and commercial flows. The type and rate of planned industrial development actually experienced will determine which projection is more accurate.

If the wastewater flow projections using 125 gallons are reasonably accurate, the proposed project could serve the Design Service Area through most of the century without expansion. If WSSC's estimates are more accurate, the Piscataway Facility will require expansion in the early 1980's.

The actual amount of wastewater from the Anacostia Basin which may require treatment at Piscataway is dependent upon how Blue Plains capacity is allocated among Maryland, Virginia, and the District.

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[1] Certainly an average annual increase of 14,000 is not indicative of past trends. Although the estimated 1972 increase of close to 20,000 (during the sewer moratorium in much of the County) is lower than the 1960's average of over 30,000, the estimated future increase would require a significant departure from the past.

TABLE 14A

PROJECTED WASTEWATER FLOWS (mgd)

	1982		1992		2000		Ultimate	
	125XPop -	WSSC	125XPop -	WSSC	125XPop -	WSSC	125XPop -	WSSC
Piscataway Creek	8.7 -	15.1	13.4 -	20.6	17.2 -	24.7	38.8 -	49.7
Henson Creek	9.8 -	14.4	11.7 -	17.4	13.2 -	19.1	19.7 -	27.0
Carey Branch	1.0 -	(2)	1.8 -	(2)	1.9 -	(2)	2.5 -	(2)
Total Design Service Area	19.5 -	29.5	26.9 -	38.0	32.3 -	43.8	61.0 -	76.7
Anacostia (P.G.CO.)	43.2 -	61.4	52.6 -	74.1	57.9 -	80.8	65.2 -	95.6
Anacostia (Mont.CO)(1)	24.5 -	28.3	26.0 -	32.3	26.9 -	34.1	32.4 -	40.1
Total Potential Addition	67.7 -	89.7	78.6 -	106.4	84.8 -	114.9	97.6 -	135.7
Total Potentially Serviceable Area	87.2 -	119.2	105.5 -	144.4	117.0 -	158.7	158.6 -	212.4

(1) Flow figures were derived by interpolating WSSC flow projections and population projections.

(2) Carey Branch flows are included in Henson Creek Projections.

The State of Maryland's Draft Potomac-Metropolitan Area Water Quality Management Plan (303e) anticipates considerable increases in Virginia and District flows which would require that Maryland provide increased treatment capacity. Table 14B illustrates these projections and the potential capacity requirements at Piscataway. It should be noted that the total excess flows which are planned to be treated at Piscataway will result from reduction in Maryland's 155 mgd purchased capacity at Blue Plains. These flows will be from the Anacostia Basin.

II.I. IDENTIFICATION OF ENVIRONMENTALLY SENSITIVE AREAS.

Environmentally sensitive areas are those fragile geographic areas whose natural processes, when disturbed, incur direct economic, social, and/or environmental costs. Consequently, these areas should be protected and properly managed in order to prevent, or at least minimize, adverse impacts resulting from man's actions. This can be accomplished in part by using the environmentally sensitive areas as indicators for land use planning.

Figure 19 is a composite map of the natural features in the Washington, D.C. SMSA developed by the Metropolitan Washington Council of Governments. This Figure, in conjunction with Tables 4 and 6, and Figures 12, 13 and 14, depicts some of the environmentally sensitive areas in the Potentially Serviceable Area. For example, the Beltsville-Chillum-Leonardtown-Elkton Soil Association (14) underlain by Brandywine Gravel (17) has generally poor drainage and is not suitable for on-lot septic systems due to high and pearched water tables and is normally not suitable for highways. However, the Collington-Adelphia-Monmouth-Metapeake-Galestown Soil Association (16), underlain by the Aquia Formation (15), is moderate to good as to its suitability for on-lot septic tanks but it is also a major aquifer. As was already pointed out in Section II.D., the Washington Metropolitan Area is approaching what may be a water supply crisis. Consequently, such aquifer areas should be protected for possible future use as water supply.

Figure 19 also depicts other environmentally sensitive areas such as flood plains, and those areas which are subject to landslides. The East Coast, in general, has been notoriously famous for ignoring and neglecting its flood plains by not only allowing development to occur in them but by allowing it to occur in such a haphazard and irresponsible manner that can be evidenced throughout the region. Consequently, the areas which have not yet been mis-used beyond recovery are of even more prime importance.

TABLE 14B[1]

PROJECTED WASTEWATER FLOWS* AND TREATMENT CAPACITIES

TREATMENT	1980	1990	2000
Montgomery County	28.2	56.7	78.2
Blue Plains			
District of Columbia	135.0	157.5	180.0
Virginia	27.0	36.3	51.3
Subtotal (DC and VA.)	162.0	193.8	231.3
Montgomery County	47.3	52.0	55.0
Oxon Run	12.3	14.5	16.1
Subtotal (all BP except Anacostia)	221.6	260.3	302.4
Anacostia	86.3	99.6	114.9
TOTAL	307.9	359.9	417.3
Total Regional Flows Requiring Treatment at Alternative Location (=Total flow minus 309)	0	50.9	108.3
Maryland Flows over Purchased Capacity of 155 mgd	(9.1)	11.1	31.0
DC and Virginia Flows over combined purchased capacity of 154 mgd	8.0	39.8	77.3
Piscataway			
Local Flows (Piscataway and Henson Creek)	26.4	36.3	43.8
Capacity at Piscataway Required to Treat Md. Flows, local plus Md. BP Excess	26.4	47.4	74.8
Capacity at Piscataway Required to Treat Local Flows plus Blue Plains Excess	26.4	87.2	152.1

*Based on data provided by WSSC's higher computation.

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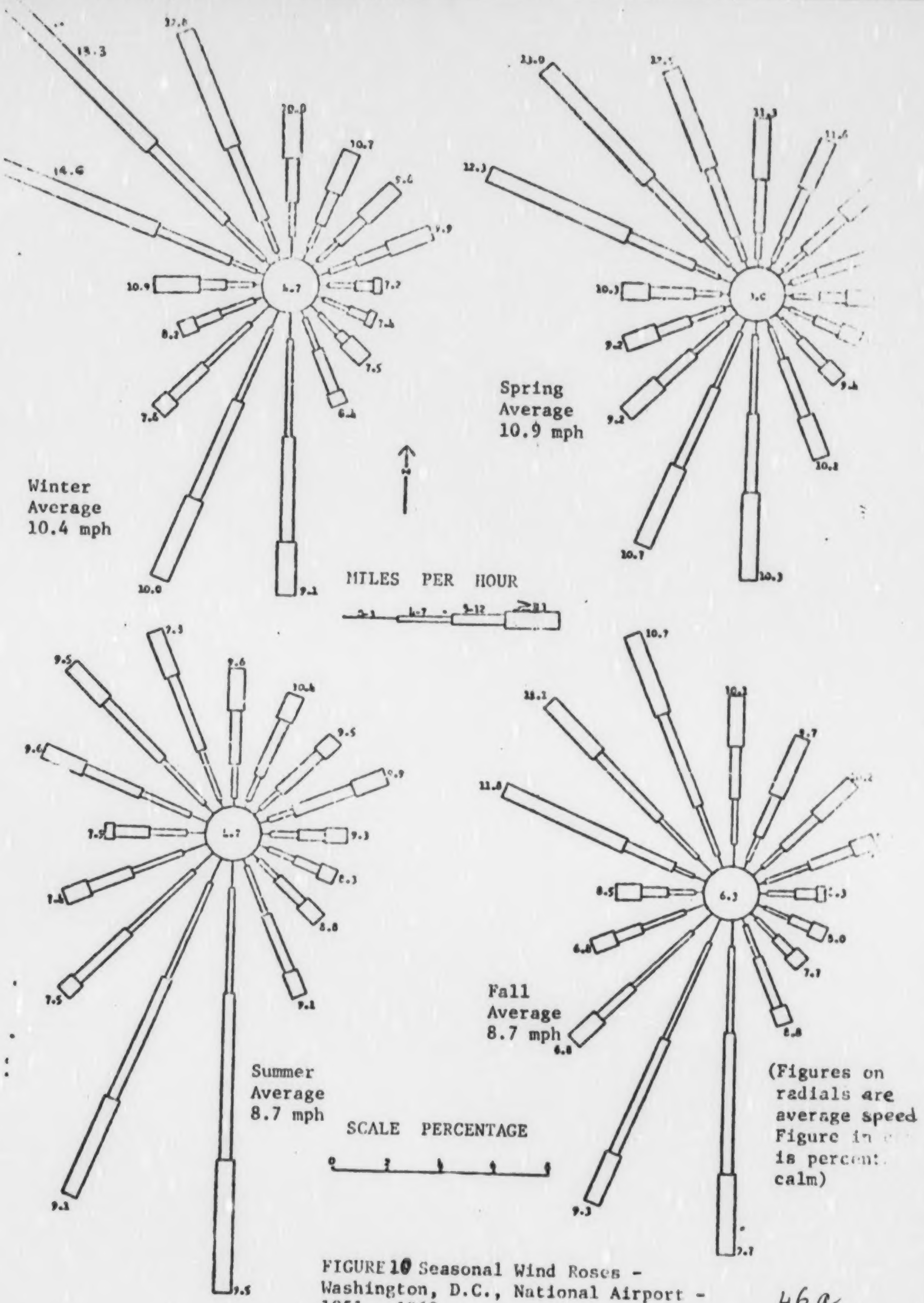
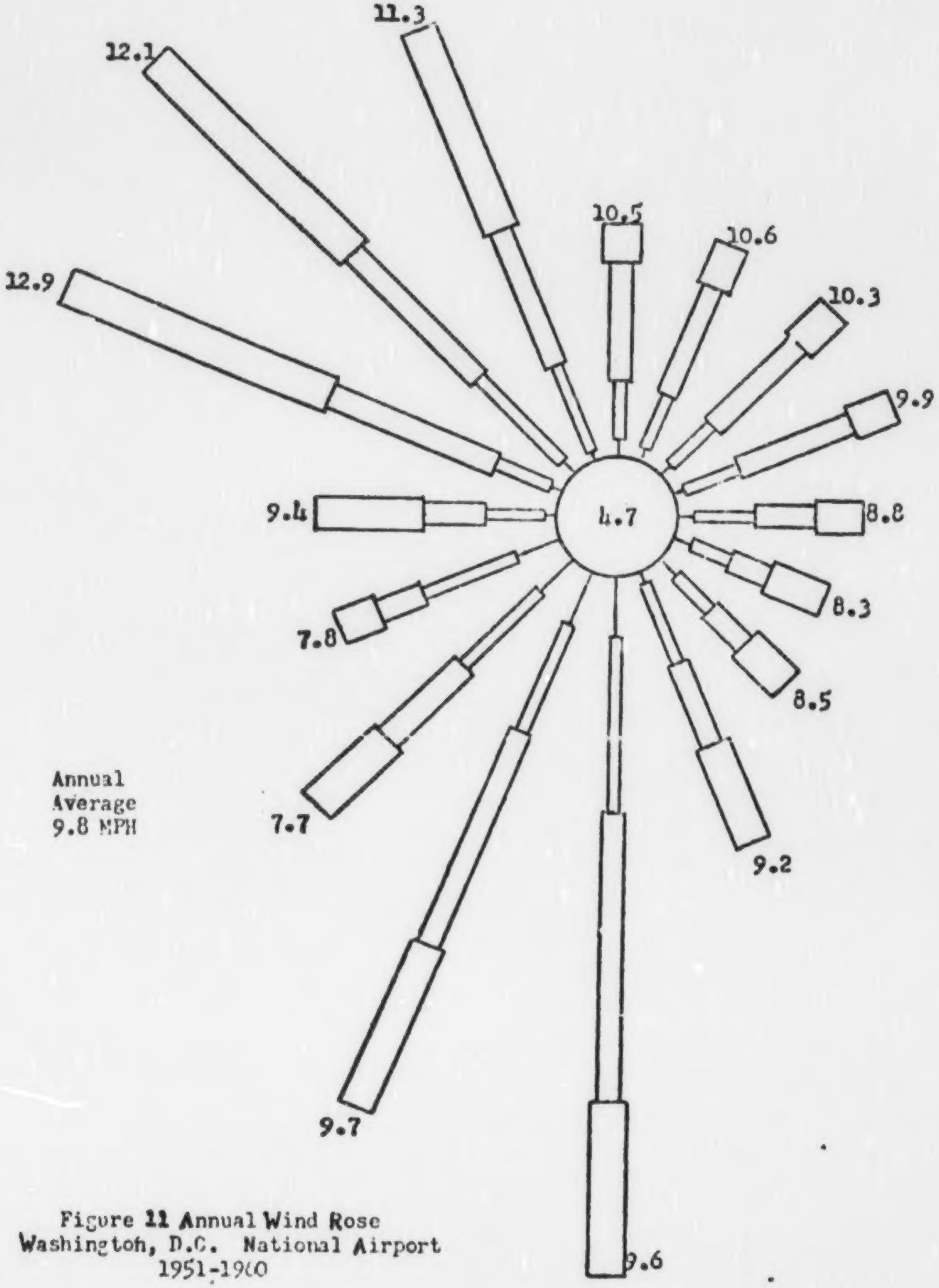
[1] Draft State of Maryland Potomac - Metropolitan Area Basin Water Quality Management Plan, March 1974.



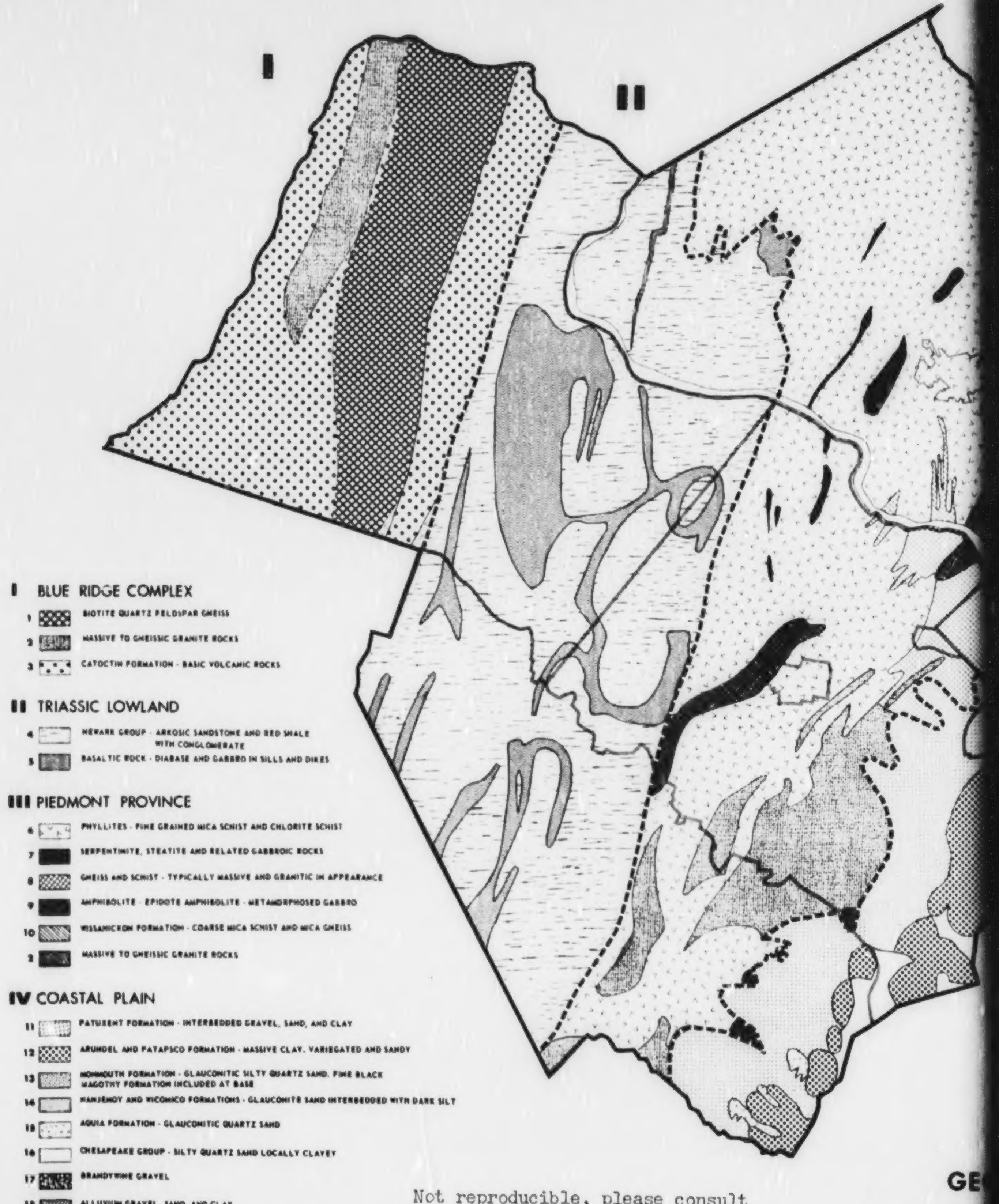
(Figures on
radials are
average speed
Figure in
is percent
calm)

FIGURE 10 Seasonal Wind Roses -
Washington, D.C., National Airport -
1951 - 1960



Annual
Average
9.8 MPH

Figure 11 Annual Wind Rose
Washington, D.C. National Airport
1951-1960


I
II
GE
WASH
I BLUE RIDGE COMPLEX
1 BIOTITE QUARTZ FELDSPAR GNEISS
2 MASSIVE TO GNEISSIC GRANITE ROCKS
3 CATOCTIN FORMATION - BASIC VOLCANIC ROCKS
II TRIASSIC LOWLAND
4 NEWARK GROUP - ARKOSIC SANDSTONE AND RED SHALE WITH CONGLOMERATE
5 BASALTIC ROCK - DIABASE AND GABBRO IN SILLS AND DIKES
III PIEDMONT PROVINCE
6 PHYLLITES - FINE GRAINED MICA SCHIST AND CHLORITE SCHIST
7 SERPENTINITE, STEATITE AND RELATED GABBROIC ROCKS
8 GNEISS AND SCHIST - TYPICALLY MASSIVE AND GRANITIC IN APPEARANCE
9 AMPHIBOLITE - EPIDOTE AMPHIBOLITE - METAMORPHOSED GABBRO
10 WISSAHICKON FORMATION - COARSE MICA SCHIST AND MICA GNEISS
2 MASSIVE TO GNEISSIC GRANITE ROCKS
IV COASTAL PLAIN
11 PATUXENT FORMATION - INTERBEDDED GRAVEL, SAND, AND CLAY
12 ARUNDEL AND PATAPSCO FORMATION - MASSIVE CLAY, VARIEGATED AND SANDY
13 MONMOUTH FORMATION - GLAUCONITIC SILTY QUARTZ SAND, FINE BLACK MAGOTHY FORMATION INCLUDED AT BASE
14 NANJEMOY AND VICOMICO FORMATIONS - GLAUCONITE SAND INTERBEDDED WITH DARK SILT
15 AQUIA FORMATION - GLAUCONITIC QUARTZ SAND
16 CHESAPEAKE GROUP - SILTY QUARTZ SAND LOCALLY CLAYEY
17 BRANDYWINE GRAVEL
18 ALLUVIUM-GRAVEL, SAND, AND CLAY
19 QUANTICO SLATE
PRIME SOURCE U.S.G.S. DOCUMENTS

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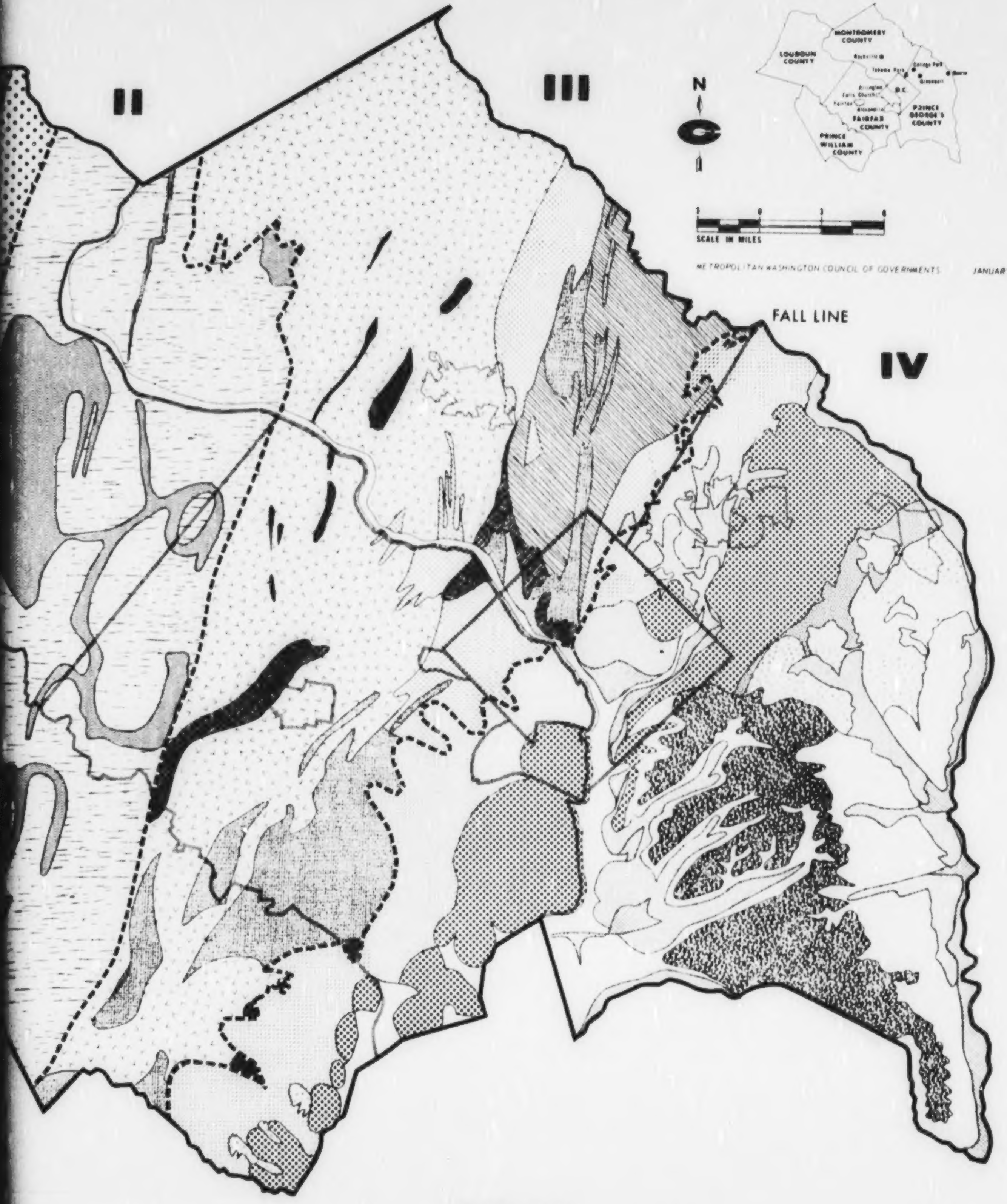

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d.

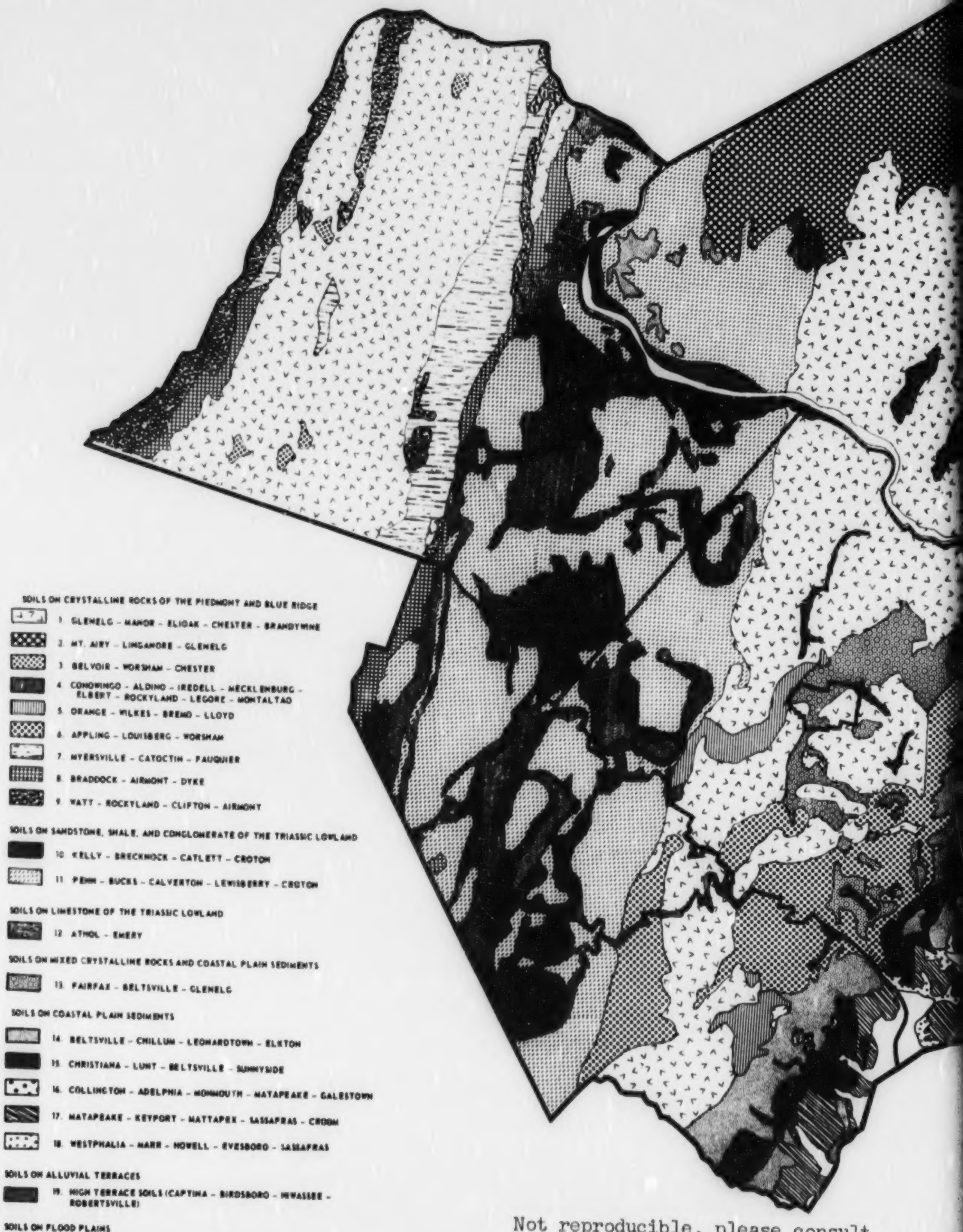
GEOLOGY (GENERALIZED)

WASHINGTON METROPOLITAN AREA

[illegible]

46 c

FIGURE 12


SOILS ON CRYSTALLINE ROCKS OF THE PIEDMONT AND BLUE RIDGE
1 GLENELG – MANOR – ELIOAK – CHESTER – BRANDYWINE
2. MT. AIRY – LINGANORE – GLENELG
3 BELVOIR – WORSHAM – CHESTER
4 CONOWINGO – ALDINO – IREDELL – MECKLENBURG – ELBERT – ROCKYLAND – LEGORE – MONTALTAO
5 ORANGE – WILKES – BREMO – LLOYD
6 APPLING – LOUISBERG – WORSHAM
7 MYERSVILLE – CATOCTIN – FAUQUIER
8 BRADDOCK – AIRMONT – DYKE
9 WATT – ROCKYLAND – CLIFTON – AIRMONT
SOILS ON SANDSTONE, SHALE, AND CONGLOMERATE OF THE TRIASSIC LOWLAND
10 KELLY – BRECKNOCK – CATLETT – CROTON
11 PENN – BUCKS – CALVERTON – LEWISBERRY – CROTON
SOILS ON LIMESTONE OF THE TRIASSIC LOWLAND
12. ATHOL – EMERY
SOILS ON MIXED CRYSTALLINE ROCKS AND COASTAL PLAIN SEDIMENTS
13. FAIRFAX – BELTSVILLE – GLENELG
SOILS ON COASTAL PLAIN SEDIMENTS
14. BELTSVILLE – CHILLUM – LEONARDTOWN – ELKTON
15. CHRISTIANA – LUNT – BELTSVILLE – SUNNYSIDE
16. COLLINGTON – ADELPHIA – MONMOUTH – MATAPEAKE – GALESTOWN
17. MATAPEAKE – KEYPORT – MATTAPEX – SASSAFRAS – CROOM
18. WESTPHALIA – MARR – HOWELL – EVESBORO – SASSAFRAS
SOILS ON ALLUVIAL TERRACES
19. HIGH TERRACE SOILS (CAPTINA – BIRDSBORO – HIWASSEE – ROBERTSVILLE)
SOILS ON FLOOD PLAINS
20. LOW TERRACE SOILS (BIBB – TIDAL MARSH – HUNTINGTON – CHEWACIA)

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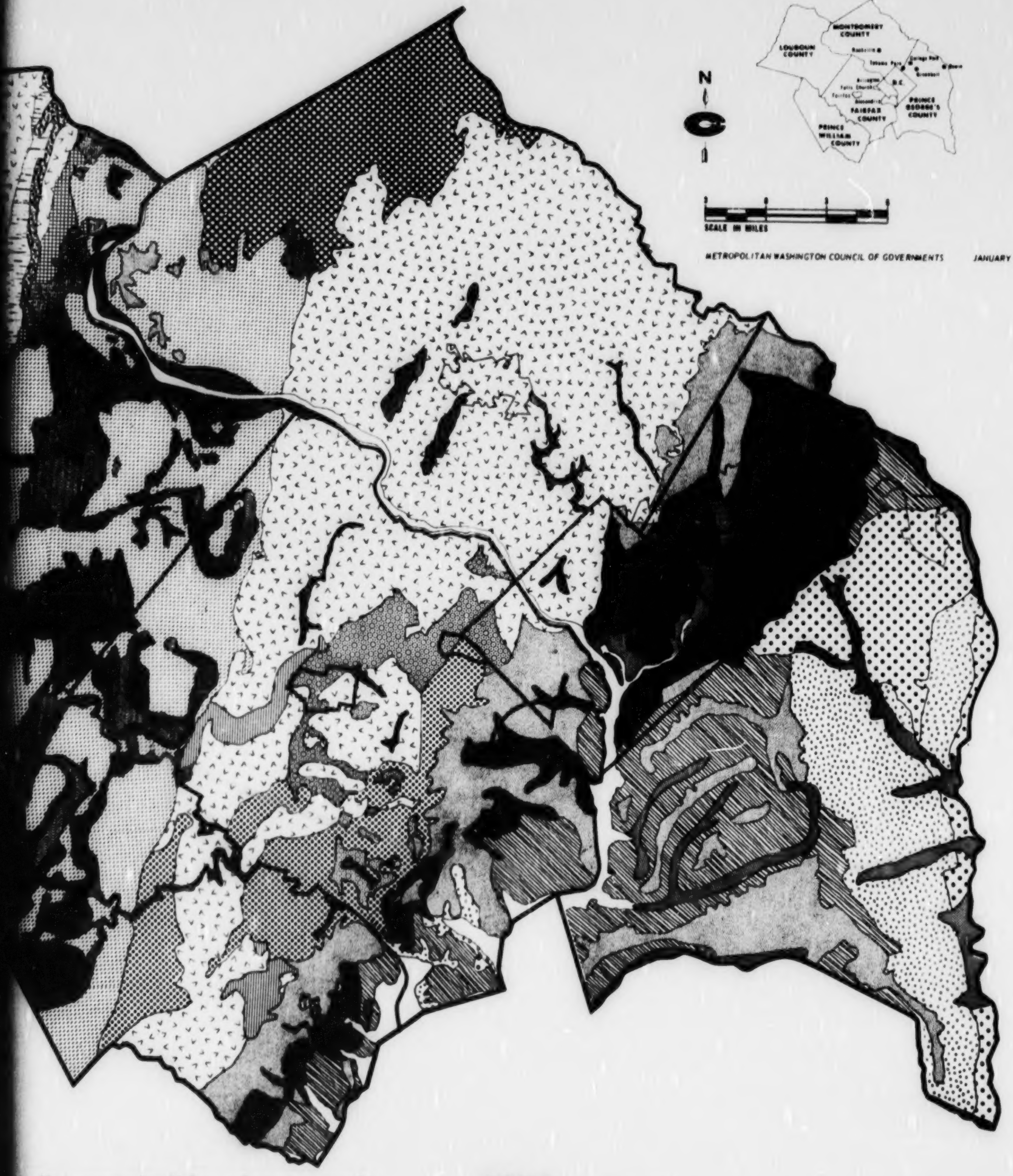
A

SOURCES *UNIVERSITY OF MARYLAND, VIRGINIA POLYTECHNICAL INSTITUTE, SOIL CONSERVATION SERVICE*



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SOILS (GENERALIZED)

WASHINGTON METROPOLITAN AREA

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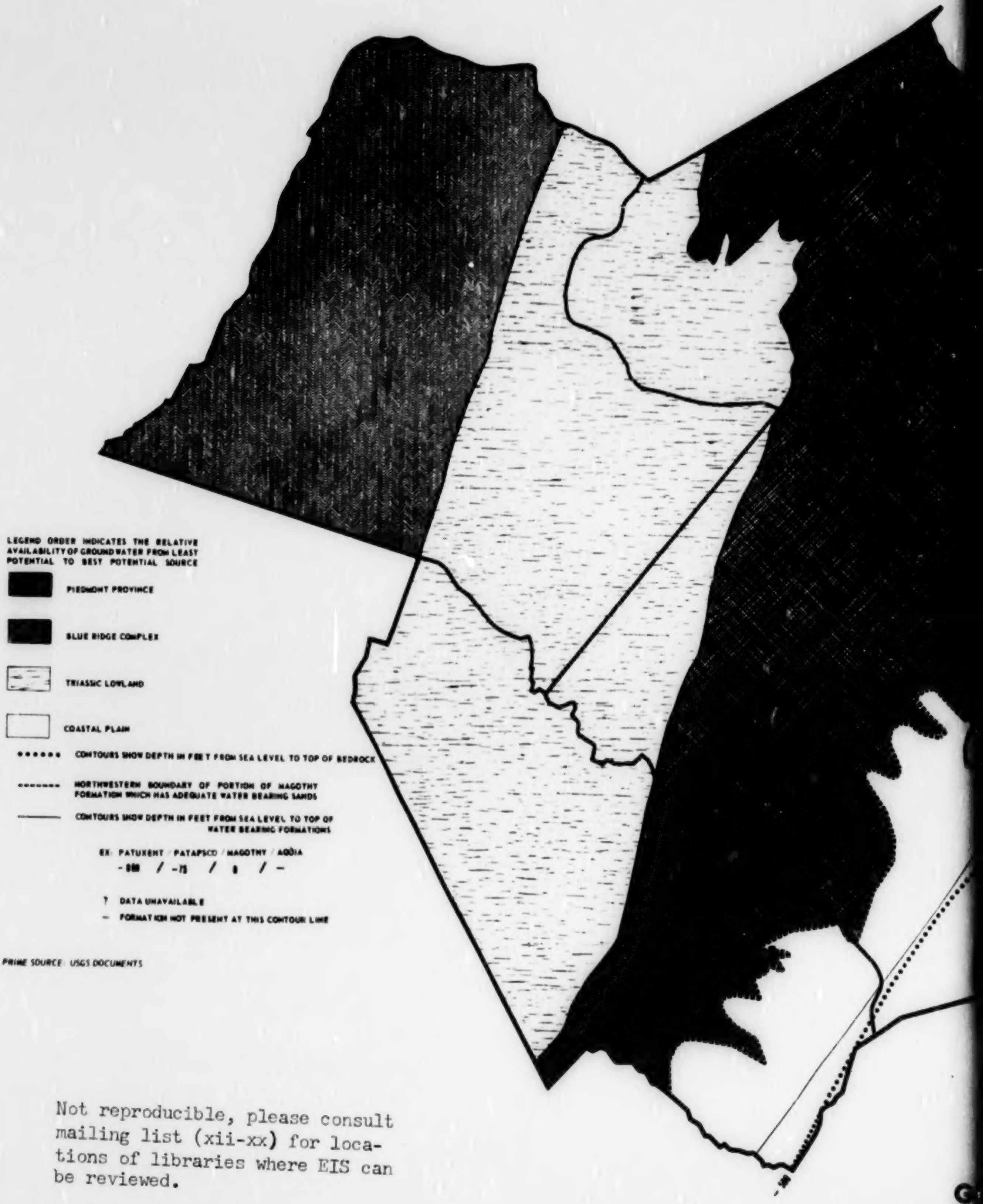
46d B

FIGURE 13


LEGEND ORDER INDICATES THE RELATIVE AVAILABILITY OF GROUNDWATER FROM LEAST POTENTIAL TO BEST POTENTIAL SOURCE
PIEDMONT PROVINCE
BLUE RIDGE COMPLEX
TRIASSIC LOWLAND
COASTAL PLAIN
CONTOURS SHOW DEPTH IN FEET FROM SEA LEVEL TO TOP OF BEDROCK
NORTHWESTERN BOUNDARY OF PORTION OF MAGOTHY FORMATION WHICH HAS ADEQUATE WATER BEARING SANDS
CONTOURS SHOW DEPTH IN FEET FROM SEA LEVEL TO TOP OF WATER BEARING FORMATIONS
EX: PATUXENT / PATAPSCO / MAGOTHY / AQUIA
-800 / -75 / 0 / –
? DATA UNAVAILABLE
– FORMATION NOT PRESENT AT THIS CONTOUR LINE
PRIME SOURCE: USGS DOCUMENTS

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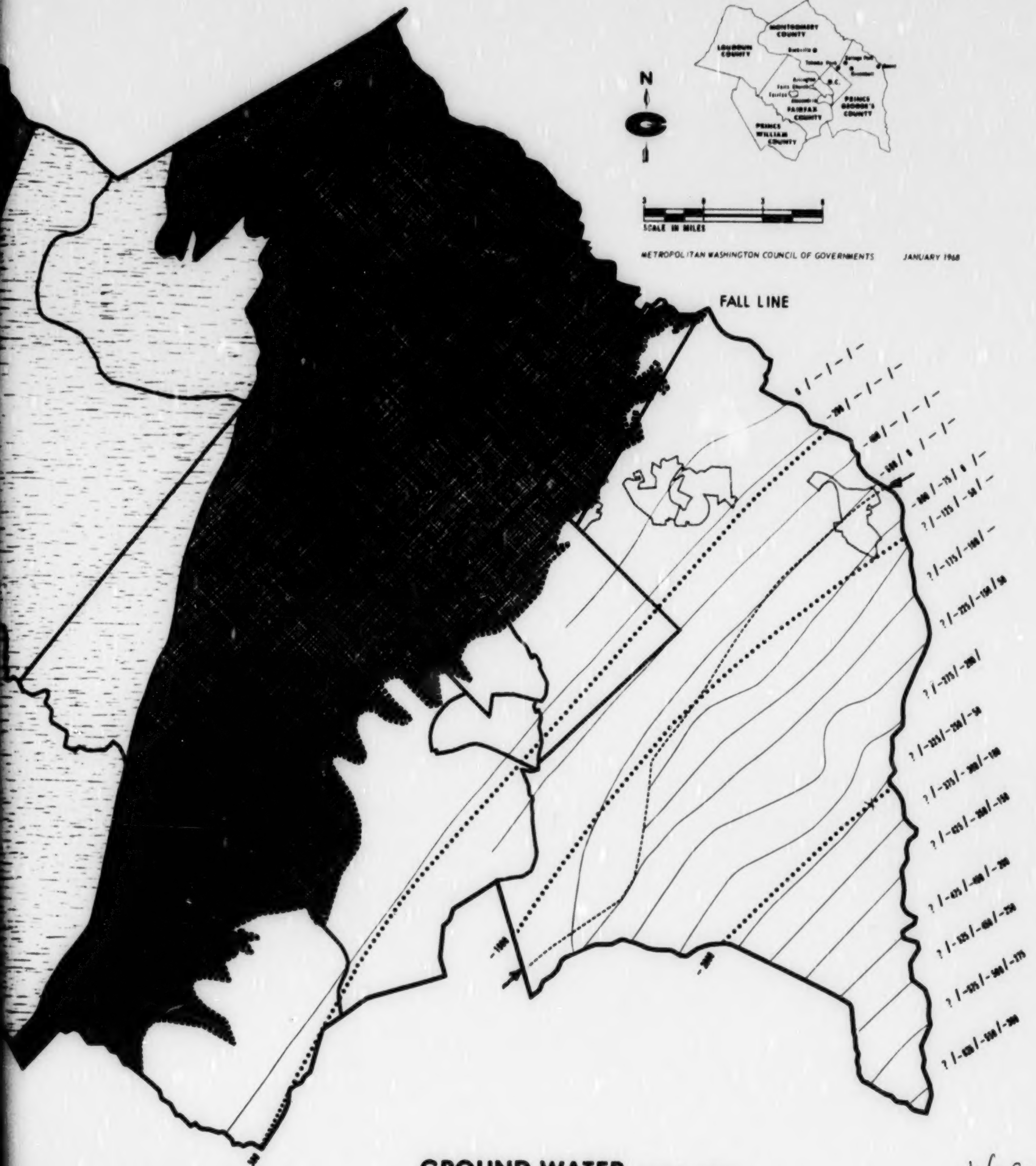
A



METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS JANUARY 1968

GROUND WATER (GENERALIZED)

WASHINGTON METROPOLITAN AREA

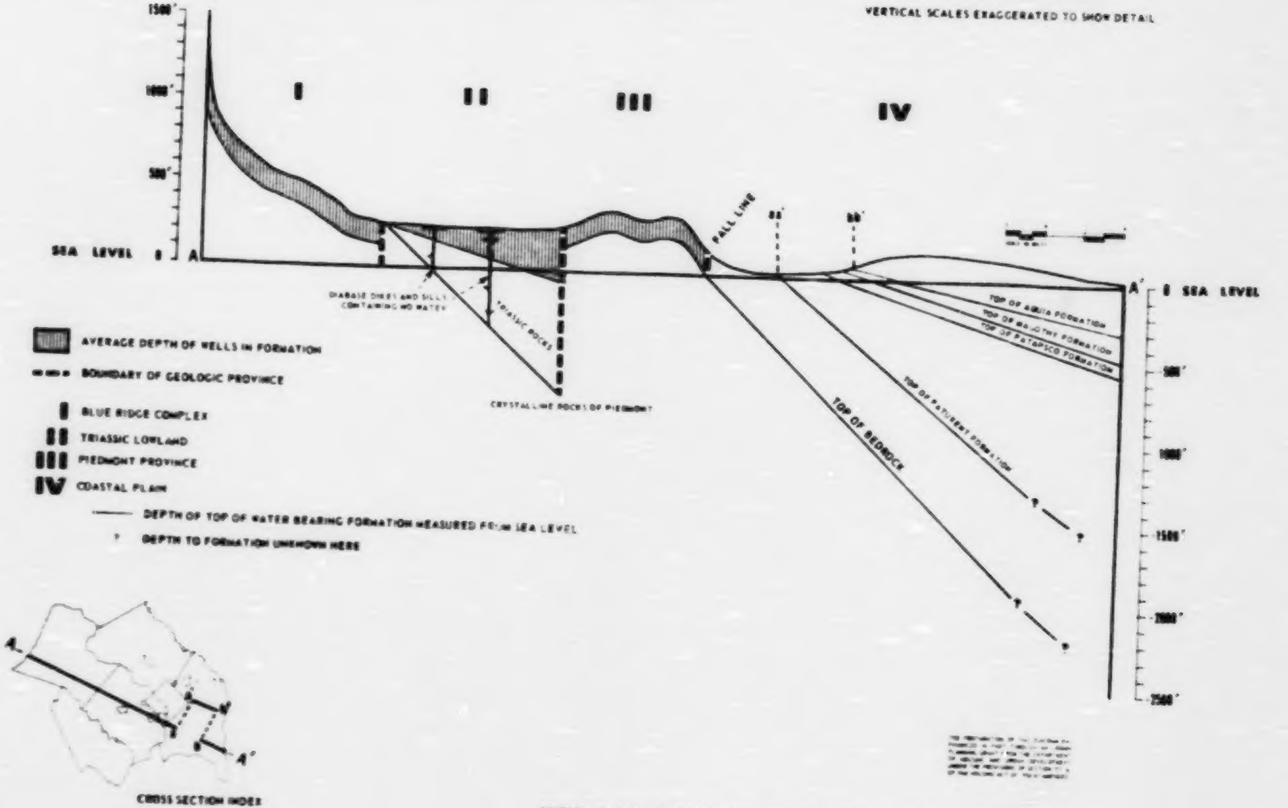
46e

β

FIGURE 14

Figure 15

GROUND WATER


1500'
1000'
500'
SEA LEVEL 0
A
I
II
III
IV
FALL LINE
88'
88'
DIABASE DIKES AND SILLS CONTAINING NO WATER
TRIASSIC ROCKS
CRYSTALLINE ROCKS OF PIEDMONT
TOP OF AQUIA FORMATION
TOP OF MAGOTHY FORMATION
TOP OF PATAPSCO FORMATION
TOP OF PATUXENT FORMATION
TOP OF BEDROCK
?
A'
0 SEA LEVEL
500'
1000'
1500'
2000'
2500'
▨ AVERAGE DEPTH OF WELLS IN FORMATION
BOUNDARY OF GEOLOGIC PROVINCE
I BLUE RIDGE COMPLEX
II TRIASSIC LOWLAND
III PIEDMONT PROVINCE
IV COASTAL PLAIN
DEPTH OF TOP OF WATER BEARING FORMATION MEASURED FROM SEA LEVEL
? DEPTH TO FORMATION UNKNOWN HERE
A
A'
CROSS SECTION INDEX

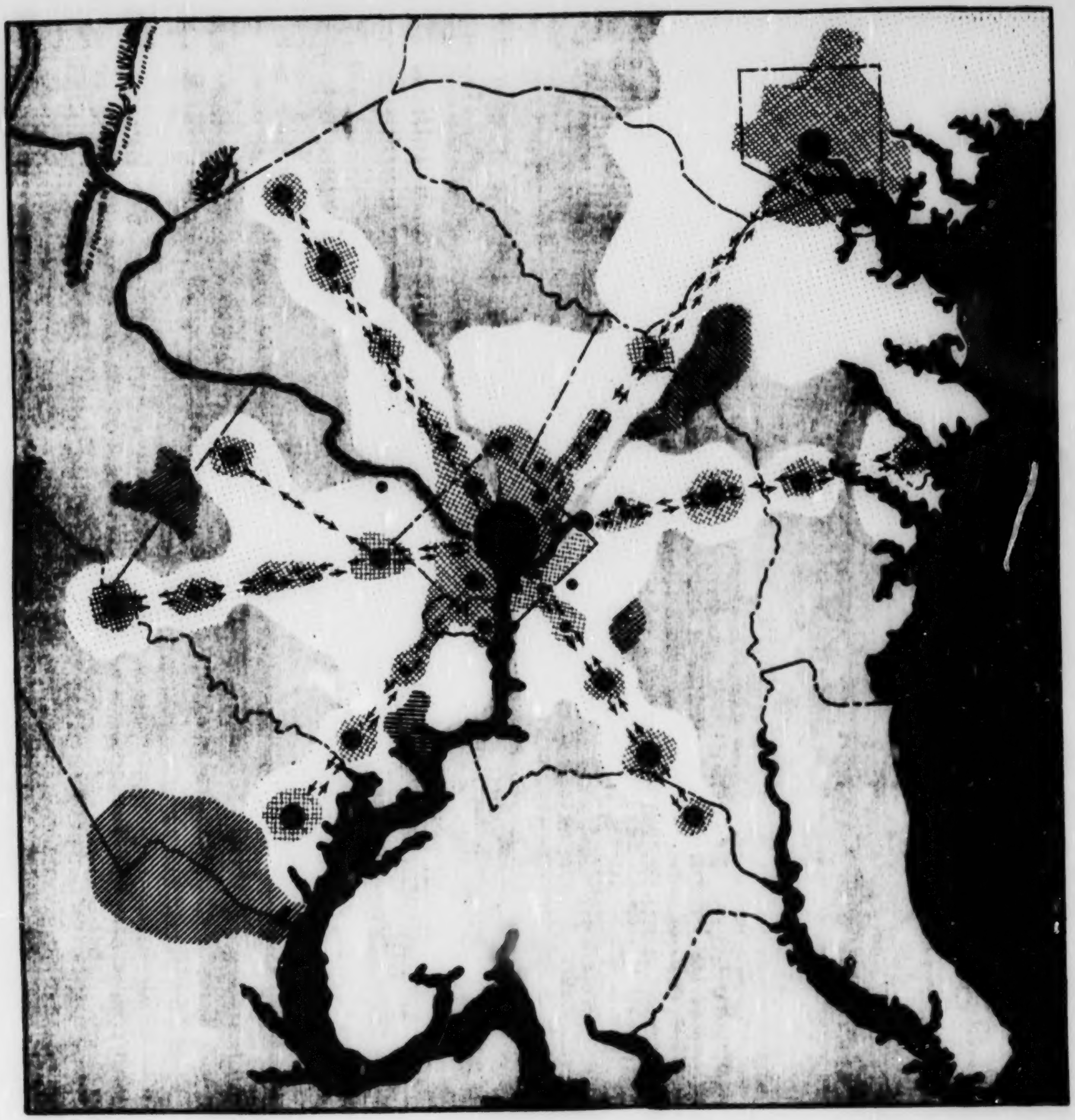
SCHEMATIC CROSS SECTION

VERTICAL SCALES EXAGGERATED TO SHOW DETAIL

SOURCE: ADAPTED FROM USGS DATA BY THE METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

Figure 15

46 f

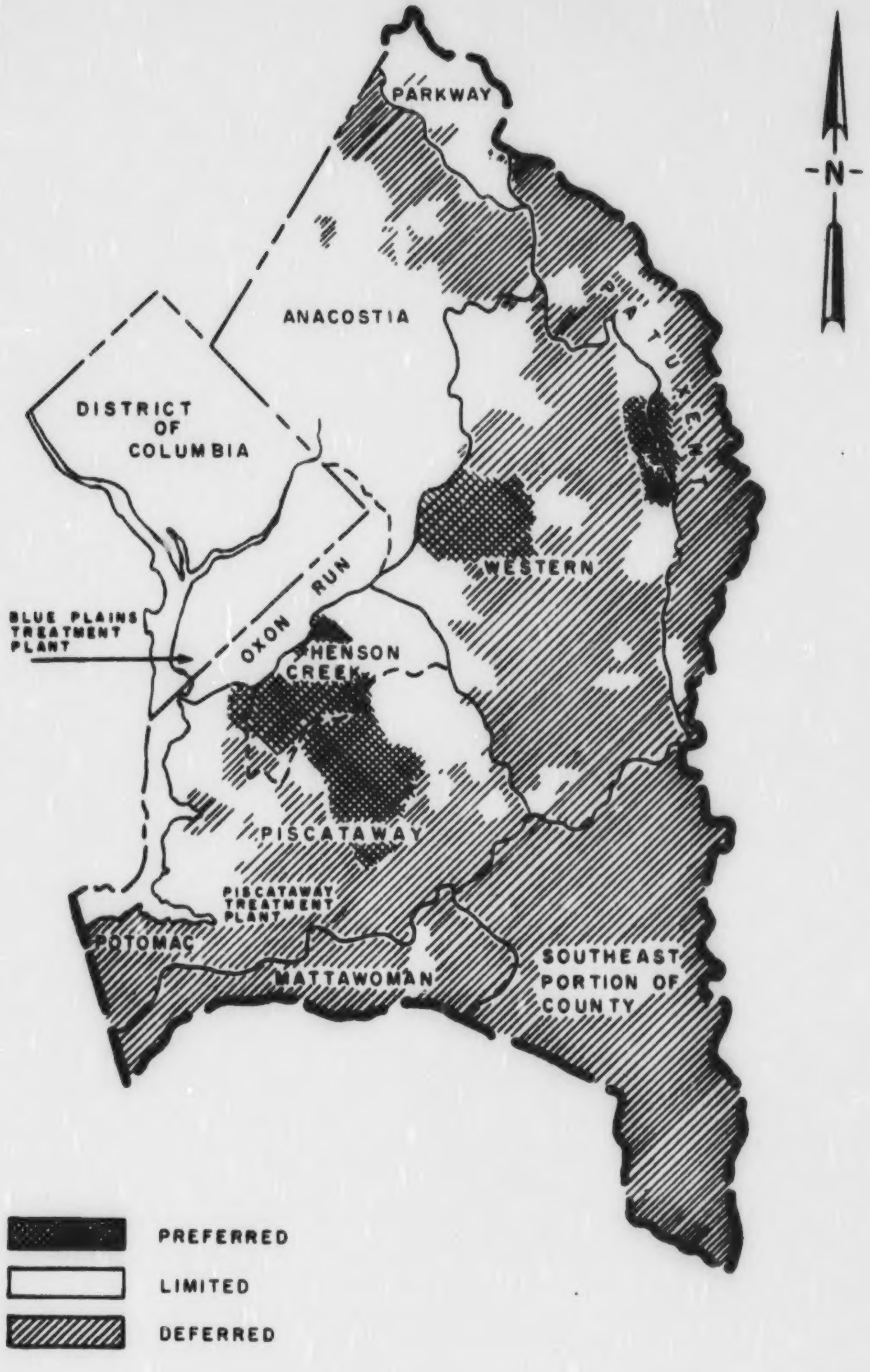


COG REGIONAL DEVELOPMENT POLICY

YEAR 2000 RADIAL CORRIDORS

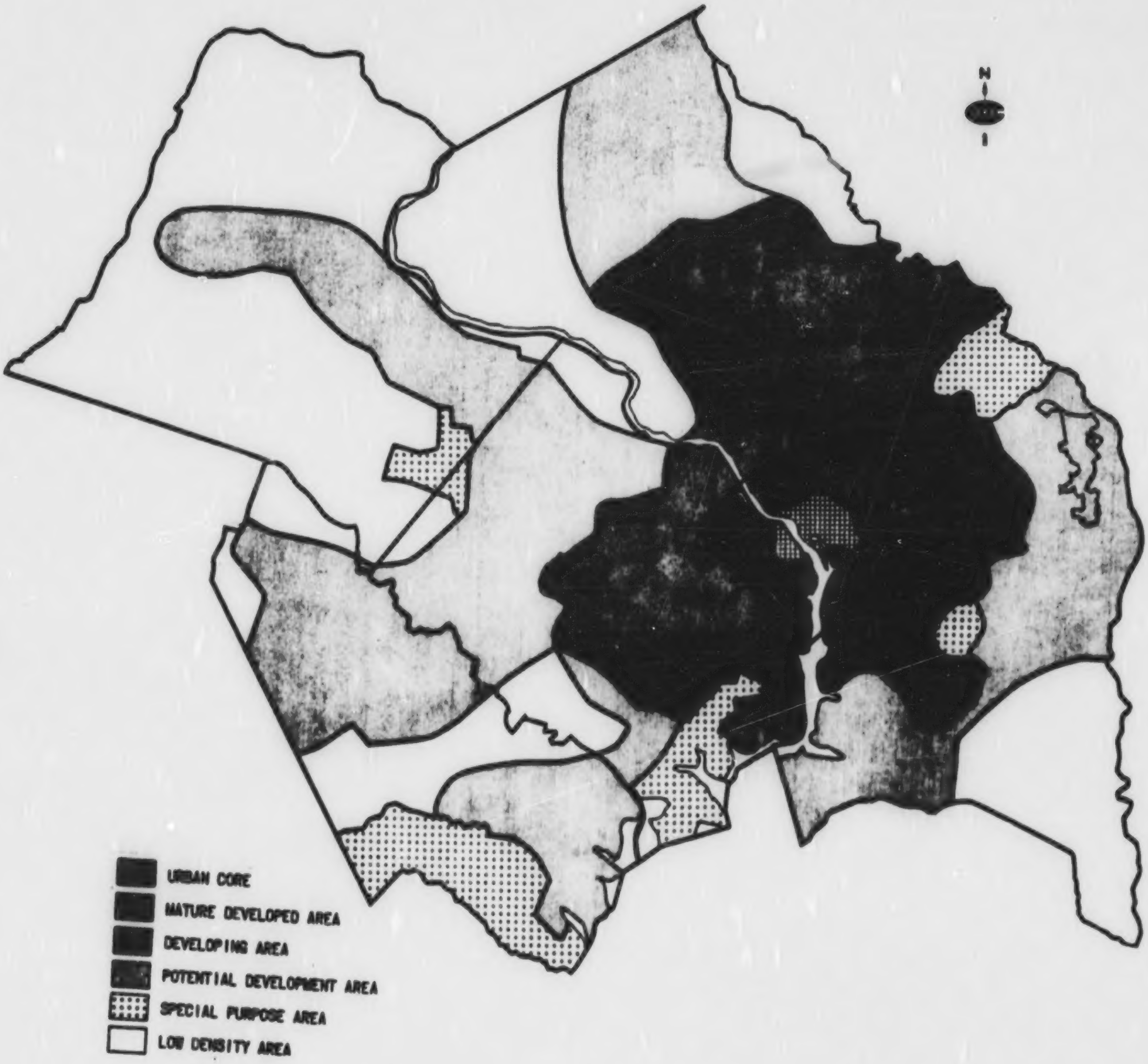
Figure 16

46g



DEVELOPMENT AREAS
PRINCE GEORGES COUNTY
(Major Service Areas Shown)

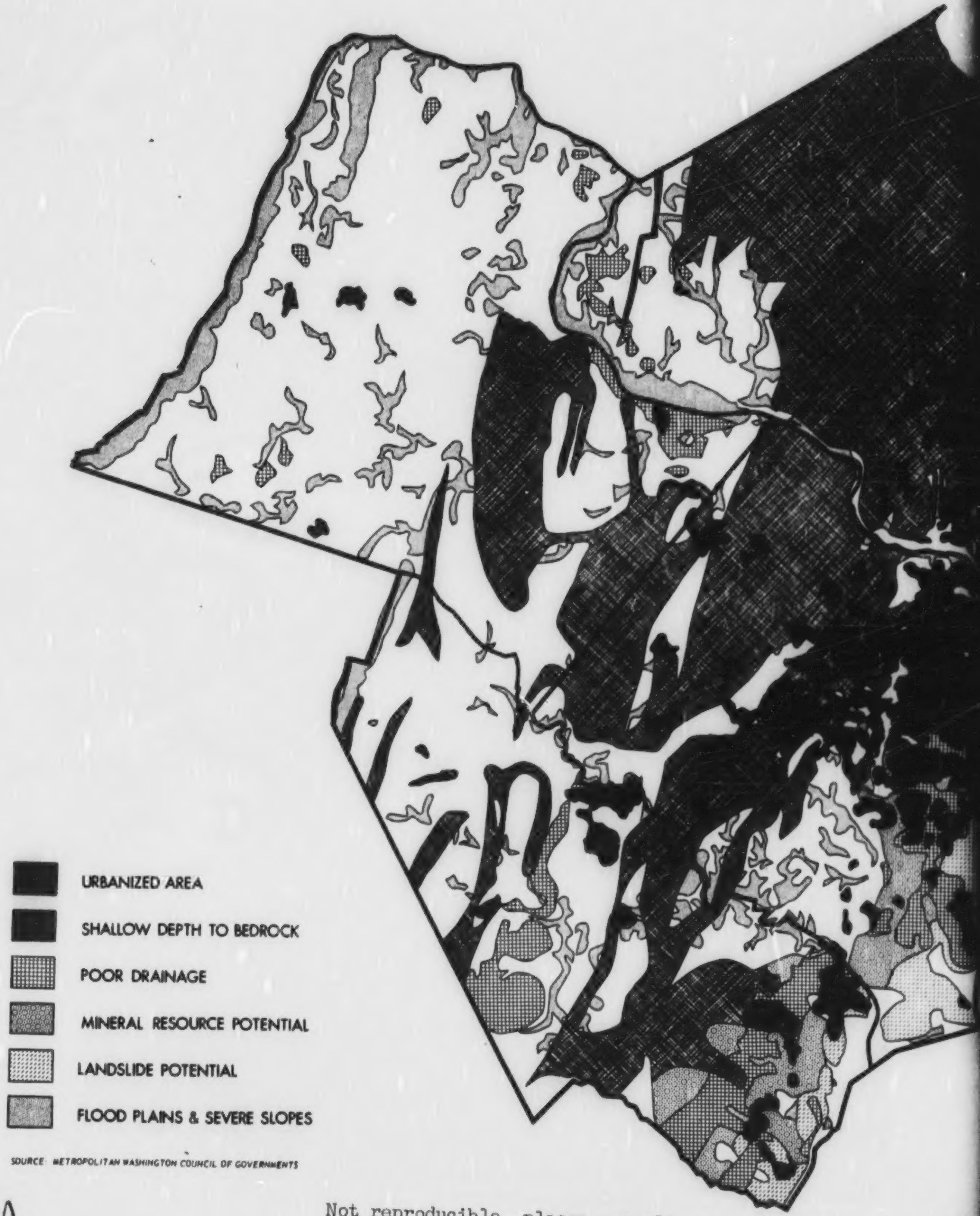
FIGURE 17



GENERALIZED REGIONAL DEVELOPMENT PATTERN
(Based on 1960-1968 Trends)

Source: COG

Figure 18



SOURCE: METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

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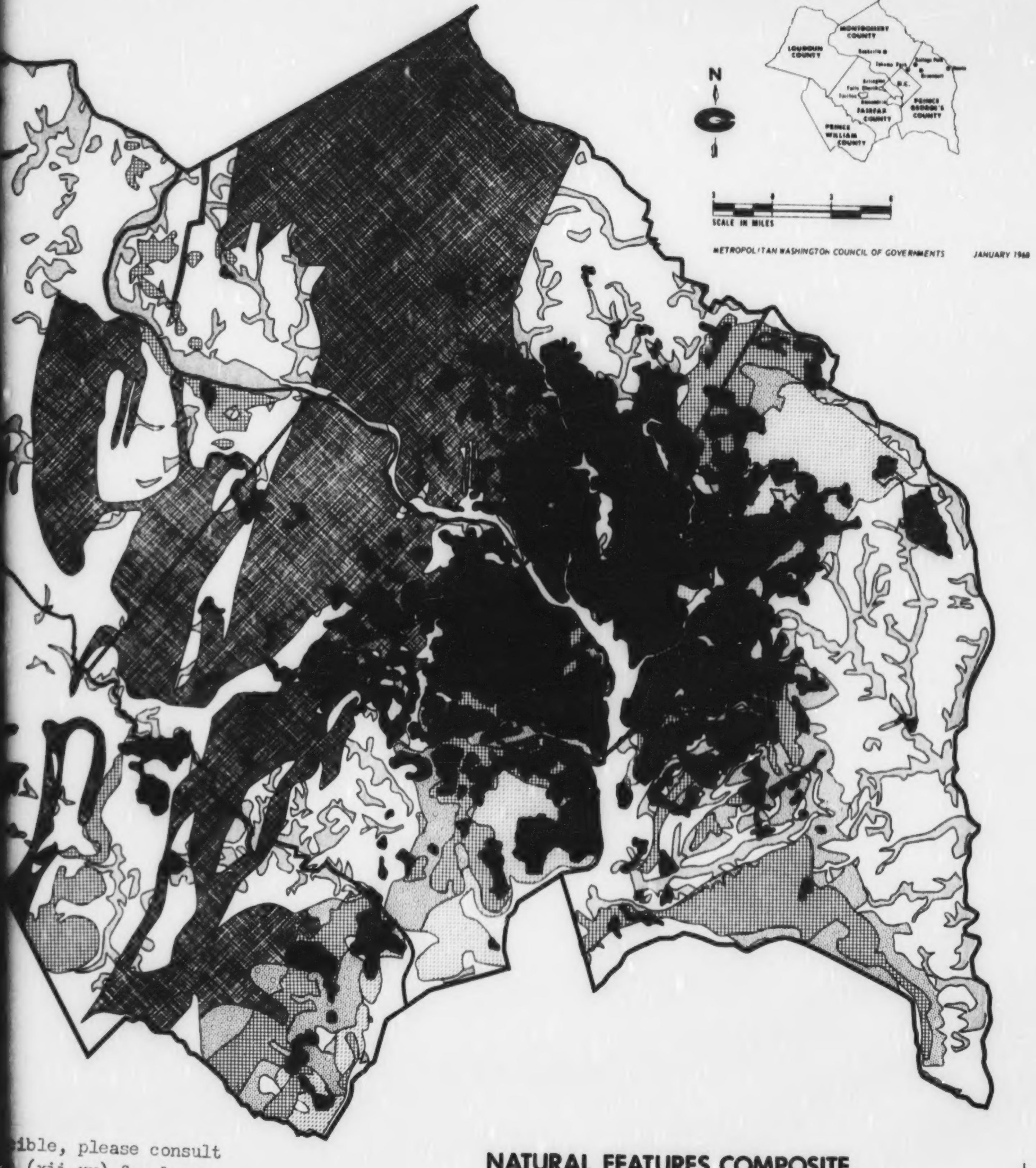

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NATURAL FEATURES COMPOSITE

WASHINGTON METROPOLITAN AREA

THE PREPARATION OF THIS REPORT WAS FINANCED IN PART THROUGH AN URBAN PLANNING GRANT FROM THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT UNDER THE PROVISIONS OF SECTION 701 OF THE HOUSING ACT OF 1954 AS AMENDED

B
46 j

FIGURE 19

III. ALTERNATIVES

In evaluating various alternatives to the proposed action for providing advanced wastewater treatment for 30 mgd of wastewater in the Piscataway Design Service Area, one consideration must be emphasized - that the proposed action is primarily an upgrading (to AWT) of existing wastewater treatment facilities. The Piscataway facility has existing capacity to provide 30 mgd secondary wastewater treatment. However, as was explained in Section I.B. and I.D., the existing facility is limited to a 17 mgd effluent discharge. The term "expansion" (as was also explained earlier), in the title of the EIS, refers only to the increase in allowable discharge (up to 30 mgd) which will be provided as a result of the upgrade in treatment and the construction of the effluent discharge pipe. Consequently, emphasis was placed on evaluating alternative methods of providing advanced wastewater treatment and alternatives to the location and size of the effluent discharge pipe and not on the location of AWT facilities. In addition, for the sake of practicality and economies, it is felt that existing facilities should be utilized to the greatest extent possible. However, although there presently exists sludge incineration facilities capable of handling 30 mgd AWT worth of sewage sludge, due to the comments received on the Draft EIS opposing the use of these incinerators, a great deal of effort has been and is continuing to be made in evaluating alternatives for sludge treatment and disposal by EPA and WSSC. Therefore, as is thoroughly discussed in Section IV.1.C., a decision as to which mode of sludge treatment and disposal which will ultimately be pursued at the Piscataway 30 mgd AWT facility will not be made until incinerator tests are completed and the results analyzed. All this information will be presented in a Supplement to this Final EIS.

In addition to the sludge alternatives presented below, Section IV.A.1.C. should be referred to for a more detailed discussion on the alternatives which are being actively investigated.

III.A. NO ACTION.

An alternative of leaving the Piscataway Wastewater Treatment Facility at its present capacity for a secondary treatment would violate the recommendations of the Potomac River Enforcement Conference under Section 8 of the Federal Water Pollution Control Act. Reduction of pollution loadings to Piscataway and the Potomac Estuary is mandatory; consequently, this alternative is not feasible.

III.B. LOCATE AWT FACILITIES ELSEWHERE.

An alternative of constructing advanced wastewater treatment facilities in another location would require a pipeline to convey the secondary effluent from the existing secondary treatment facilities to the new AWT facilities. In addition, duplication of existing support facilities would be required, increasing aesthetic impacts as well as capital investment.

This alternative presents no real advantages economically, environmentally, or socially.

III.C. CONSTRUCT SMALLER DECENTRALIZED WASTEWATER TREATMENT FACILITIES THROUGHOUT THE DESIGN SERVICE AREA.

This alternative would distribute additional wastewater treatment facilities (modular or package plants) over a wider area as they are needed to meet treatment requirements in the Piscataway area. Present sewage flows at Piscataway are 15 mgd, and the proposed effluent discharge line would allow operation to 30 mgd. Modular plants could be constructed on a step by step basis as they are needed. Effluent from the Henson Creek watershed section of the Piscataway Design Service Area could be treated at Henson Creek, eliminating the need for a force main to Piscataway Creek, and reducing the alternate loading on the Piscataway Wastewater Treatment Facility.

This alternative would allow the distribution of treated effluent from the drainage area into a number of receiving points rather than into a single receiving point at Piscataway Bay or the Potomac Estuary. This would disperse the impact of the effluent over the service area.

However, as was previously indicated, secondary wastewater treatment and some AWT facilities capable of handling 30 mgd of wastewater have already been constructed at the Piscataway site, thus constituting a sizeable capital investment. In addition, small wastewater plants scattered throughout a watershed area present difficult maintenance problems as well as continual difficulties of maintaining effluent quality. Small plants could not economically have process laboratories onsite for regular monitoring. Periodic gathering and transporting of samples would be required. Detection of process failure would be considerably slower. Further, since advanced wastewater treatment would be required in any case, the problems of chemical supply and handling of AWT sludges are greatly aggravated by dispersal.

Due to the small sizes of existing streams in the service area, their capacity to assimilate additional wastes are somewhat limited. Thus, an even higher degree of advanced wastewater treatment might be required from localized wastewater treatment plants which discharged into these streams. The technology proposed for the AWT facilities at Piscataway is representative of the state of the art at present. Higher degrees of BOD, suspended solids, and nutrient removal can be achieved only at great economic costs.

III.D. LAND TREATMENT.

Introduction.

Land Treatment is a broad term which covers a number of different schools of thought, all of which however, center around whether or not it encompasses "disposal." The environment is a closed system, which in terms of the environment (total), prohibits the "disposal" of anything. Therefore, everything is recycled or reused in the environment, and the distinction is whether or not everything is recycled or reused in the best manner. Using the definition of a waste as "a resource out of place", land treatment of wastewater and sewage sludge is possibly the best utilization of these resources.

Land treatment of sewage can be conveniently subdivided into the categories of (1) land treatment of effluent and (2) land treatment of sludges. The following discussion is restricted to the consideration of land treatment of effluent. Land treatment of sludge is discussed later.

1. Background.

Land treatment of wastewater has been practiced for many years both in the United States and worldwide. In this country, Bakersfield, California and Cheyenne, Wyoming are reported to have land treatment facilities in the 10 mgd range while, internationally, Mexico City and Melbourne, Australia, report facilities of greater than 100 mgd capacity. The existence of installations of this size suggests there is considerable operating experience with land treatment systems but literature searches conducted ten years ago would have yielded very little information concerning these systems. During the last few years there has been a renaissance in land treatment techniques and considerable technical information on the subject is now becoming available.

In 1967 the results of a pioneer research program were released as the Pennsylvania State University Study No. 23 entitled Waste Water Renovation and Conservation by R. R. Parizek, et al. This study established the year around feasibility of spray irrigation as a safe method of effluent disposal.

In the late 1960's, the Muskegon County (Michigan) Board and Department of Public Works obtained a research and development grant from the Federal Water Quality Administration (now, Environmental Protection Agency) to support a detailed investigation of the engineering feasibility of a wastewater treatment irrigation system. The investigation found that an irrigation system was feasible and construction was begun. A recent issue of American

City Magazine reports that construction of the facility is complete and that sewage is presently being received, treated, and stored in holding basins. The performance data from the Muskegon project will likely have a profound effect on the role land treatment systems plays in the future of the wastewater treatment field.

Generally, effluent land treatment systems can be categorized into one of the following classifications.

a. Cropland Irrigation.

The application of municipal effluents to the soil, for beneficial production of crops not for direct human consumption. Common methods of application include broad irrigation and spray irrigation.

b. Spray Runoff.

The application of municipal effluent to the soil in a manner conducive to overland sheet flow in a controlled manner. The physical, chemical, and biological processes take place as the liquid moves slowly over the surface. More than half of the applied effluent is returned directly to the surface waters.

c. Infiltration-Percolation.

The application of municipal effluents to the soil by means of recharge basins, ridge and furrow basins, or flooding basins.

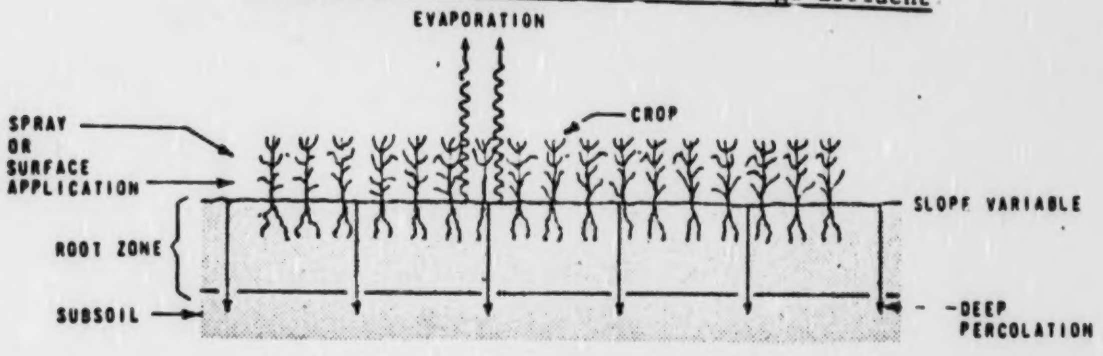
These definitions were extracted from a paper presented by Mr. John R. Trax of EPA's Office of Research and Monitoring. The paper was entitled "EPA Viewpoint on Land Application of Liquid Effluents" and was presented at the Rutgers Conference on the Land Disposal of Municipal Effluents and Sludges. Sketches of each of the three systems are presented in Figure 20, which was reproduced from a paper entitled "Nationwide Experiences in Land Treatment" by Messrs. Charles E. Pound and Ronald W. Crites of Metcalf & Eddy, Inc. Table 15 compares the characteristics of these three application techniques, and is excerpted from a paper presented at the Rutgers Conference by Messrs. Richard E. Thomas and Curtis C. Harlin, Jr., of EPA's Robert S. Kerr Water Research Center.

2. Advantages and Disadvantages of Land Treatment Methods.

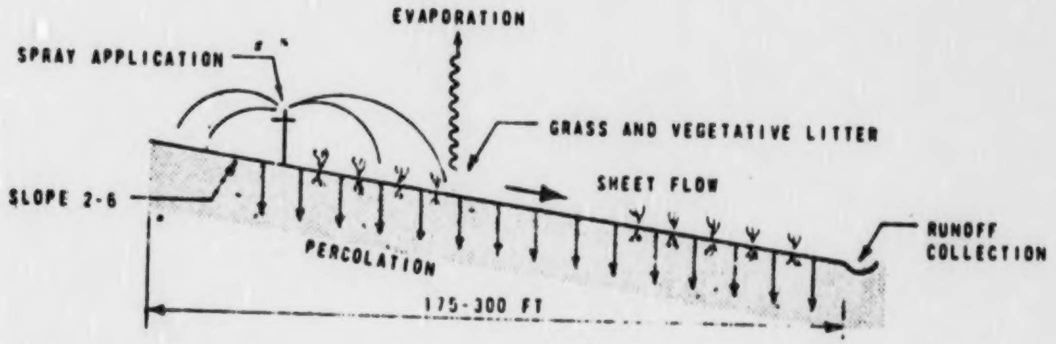
a. Advantages of Land Treatment Methods.

(1) A key advantage of the land treatment method of wastewater effluent is that the wastewater is renovated to a high degree. The concentrations of BOD, suspended solids, phosphorous,

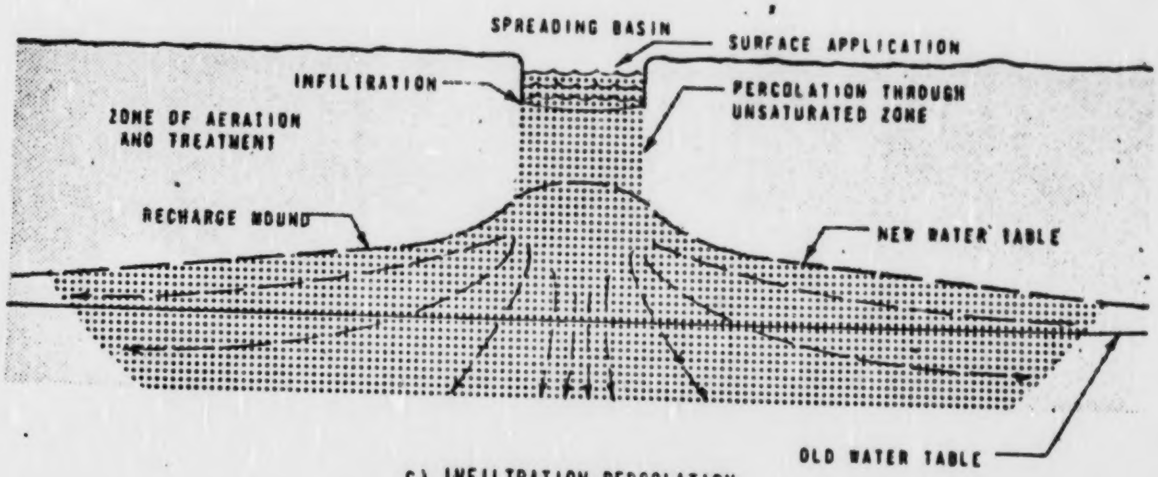
Selected Land Disposal Methods of Sewage Effluent



a) **CROPLAND IRRIGATION**



b) **SPRAY RUNOFF**



c) INFILTRATION-PERCOLATION

Figure 20

Table 15

Comparative Characteristics of Systems

Factor	Type of System Crop Irrigation	 Spray-Runoff	 Infiltration-Percolation
Application Rate	2 to 8 feet per year	8 to 15 feet per year	15 to 400 feet per year
Land Required for 1 mgd flow (3.1 ac. ft.)	140 to 560 acres plus buffer zones	75 to 140 acres plus buffer zones	3 to 75 acres plus buffer zones
Application Techniques	Spray or Flood	Spray	Usually Flood
Soils	Moderately permeable soils with good productivity when irrigated	Slowly permeable soils such as clay loams and clay	Rapidly permeable soils, such as sands, loamy sands, and sandy loams
Probability of influencing groundwater quality	Moderate	Slight	Certain
Needed Depth to Groundwater	About 5 feet	Not Known	About 15 feet
Fate of Wastewater	Predominately evaporation or deep percolation	Surface discharge dominates over evaporation and percolation	Percolation to Groundwater

reduced by land treatment. Table 16 depicts the expected performance results of the Muskegon system, discussed above.

TABLE 16

EXPECTED PERFORMANCE RESULTS OF THE MUSKEGON SYSTEM

Pollutant	Influent*	Effluent	Removal (Percent)*
B.O.D.-mg/l	250,500	Less than 4	Greater than 98.99%
Suspended solids-mg/l	250,1000	Less than 4	Greater than 98.99%
Phosphorus-mg/l	5,3	Less than 0.5	Greater than 90.83%
Nitrogen (Total)-mg/l	20,40	Less than 5	Greater than 75.87%
Coliform Bacteria-#/100 ml.	2-20x10	0	100
Pathogenic Viruses	Not measured but present in sewage	0	100

*The two figures under "influent" and "removal" are for the Muskegon-Mona Lake and the Whitehall-Montague Subsystems.

Several points should be kept in mind with respect to the data presented above. One point is that the removal efficiencies shown above are predictions rather than actual results; another point is that these figures do not represent an upper boundary of performance for the land treatment system.

(2) Another advantage of land treatment systems is that the application of water and nutrients to cropland stimulates plant growth. This effect would be expected to increase profits from a farming operation that could be conducted at the land treatment site. The Penn State study concludes that "economic benefits were obtained in the form of increased yields ranging from 17 to 300 percent in various crops."

(3) Land treatment of effluent does not have a sludge disposal problem built into it. Biological and physical-chemical AWT systems both increase the production of sludges which must be disposed of or reutilized.

(4) Multiple land use could be made of the land purchased for a land treatment system. In addition to wastewater treatment, it may be possible to use the land for agriculture, outdoor recreation, and wildlife conservation, and it could also be incorporated into a "greenbelt."

(5) A land treatment system, if properly designed and operated, could be expected to enhance the fertility of the land. The wastewater contains solid organic material which would decompose and leave a humus-like residue that could be plowed under to provide better soil aeration and water retention properties.

(6) A land treatment system would avoid the use of heavy doses of chemicals, fuel oil, and electricity which are, in most cases, environmentally and economically costly to produce.

(7) Land treatment of effluent is in fact, "recycling" of humus and nutrients, as contrasted by effluent "disposal" by conventional AWT methods.

(8) Land treatment systems are said to be less susceptible to shock loadings than biological AWT processes.

(9) The fundamental workings of the land treatment system are growth and decay. These are processes with which most people are on familiar terms. Persons living near an area selected for a land treatment site could probably be convinced that having a water renovation and land reclamation project for a neighbor is desirable whereas those same persons could be counted on to resist the introduction of a complicated technical project such as a wastewater treatment facility or an atomic reactor to their community.

(10) That fraction of the renovated wastewater that is retained in the soil may be available to recharge ground water aquifers.

b. Disadvantages of Land Treatment Methods.

(1) The outstanding disadvantages of land treatment systems is that large parcels of land are normally required for application and buffer zones. The inflation-percolation method described above has a modest land demand but could possibly result in contamination of the area's groundwater supplies.

(2) A second disadvantage of land treatment alternative is the possibility that contamination of the soil could occur as the system operates. Secondary effluents generally contain trace amounts of heavy metals such as copper, zinc, chromium, lead and mercury. These metals could accumulate in the soil where they would be available to plants. Some of these metals are toxic to plants at very low concentration so that these metal concentrations could conceivably reduce or destroy the soil's fertility. Should this condition develop, it would be extremely difficult to restore the soil to its original condition.

Another related concern is that wastewater treatment plant effluents generally contain several hundred milligrams per litre of dissolved solids. As the solids-bearing wastewater percolates through the soil, calcium ions in the soil may be exchanged for sodium ions in the effluents. As the sodium concentration in the soil increases, there is a tendency for swelling of the soil particles to occur. This swelling would reduce the percolation rate and probably adversely effect system performance.

(3) The potential for disease transmission along air or waterborne pathways does exist. In spray-type systems wastewater aerosols are formed and could transport pathogenic organisms from the wastewater to the gastro-intestinal tract or respiratory system of a host and cause an infection. Land treatment systems that contribute flow to groundwater could conceivably be responsible for polluting the groundwater. If the bedrock at the treatment site is cracked and fissured and lies near the surface, it is possible that bacterial and viral contamination could be transmitted to water supplies some distance from the land treatment site.

(4) Nitrogen is usually present in wastewater as organic nitrogen, ammonia, and nitrite-nitrate nitrogen. Processes which occur on the soil surface tend to change the dominant form from ammonia nitrogen to nitrate nitrogen. The nitrates are not bound by the soil, rather they migrate and may contaminate groundwater. The U.S. Public Health Service has long recognized that high nitrate concentrations can produce a blood disease in children and recommended 10 mg/l (as N) as the upper limit of the impurity allowable in potable water supplies.

(5) Since the possibility for disease transmission has been shown to exist, it is very likely that a large scale land treatment system for Piscataway would be the subject of a very extensive (and costly) monitoring program. Ideally, the monitoring system would be installed several years prior to construction to get an accurate measure of background conditions and its operation would continue for the life of the facility. An informational brochure prepared for the Muskegon project reports that an observation well system surrounding the Muskegon site will be used to measure changes in groundwater quality.

(6) With respect to crop production, the following situation could conceivably develop: A long period of extremely wet weather could result in complete filling of the system's storage capacity. If that condition occurred, the only available alternative would be to spray the crop even though the addition of more water during a very wet period would likely be detrimental to crop production rather than beneficial.

(7) A land treatment program could result in large volumes of water being transferred to an area's streams with a subsequent increase in the possibility of flooding and other disruptions.

3. Description and Evaluation of the Land Treatment Alternative for Wastewater Effluent.

The local treatment alternative which has been evaluated includes the assumption that the existing 5 mgd model AWT plant at Piscataway would continue to operate and discharge its effluent into Piscataway Bay, and that the effluent from the existing 25 mgd secondary facilities would be treated and applied on land by spray irrigation. Therefore, a spray irrigation system of 25 mgd capacity would be required. Table 15 indicates that the land requirement range necessary for the crop irrigation and spray runoff methods of land treatment is from 75 to 560 acres per million gallons of effluents. This Table also suggests that these land requirements need to be increased to provide border buffer zones.

Using the information on soils, geology, groundwater, etc., presented in Section II, in addition to information provided by the U.S. Department of Agriculture's Soil Conservation Service, (Appendix K), it was concluded in the Draft EIS that the soils in southern Prince George's County were not generally conducive for spray irrigation; consequently, in order to implement a spray irrigation system a large amount of land would be required, thereby resulting in excessive initial costs. However, in response to public comment EPA requested WSSC to further investigate the land treatment alternative. Additional consultation with the Soil Conservation Service and the Prince George's County Agricultural Extension Agent confirmed the conclusions that, due to dense, slowly permeable subsoils, seasonal high water tables or excessive slopes, Southwestern Prince George's County is generally not conducive for land treatment and disposal of wastewater effluent. The May 20, 1974, communication from the Soil Conservation Service (Appendix K) emphasizes these limitations in addition to physical problems, such as land clearing and topographic problems, and a possible lack of willingness by area farmers to utilize the effluent in the Washington Metropolitan Area.

Due to these physical limitations, it was estimated (conservatively) that 250 acres per mgd of effluent would be required for this alternative. Based on this, about 6,250 acres or approximately 10 square miles would be required for spray irrigation of 25 mgd of secondary effluent. In evaluating the feasibility of land treatment, one might consider it wise to look at the availability of land with respect to ultimate capacity rather than intermediate capacity. However, it has been assumed that the immediate decision is that of determining the cost effectiveness of an expansion to 25 mgd of land treatment versus upgrading a treatment plant to 30 mgd AWT. Another consideration is that land treatment does not require the assembling of land into one large parcel, however, one large parcel would lessen the amount of buffer land needed. By contrast, a shortage of suitable sites with 6,000 or 10,000 acres would make multiple siting a meaningful alternative, other things being equal.

The cost of the raw land for a 6,250 acre treatment site would require $18,750,000, assuming an acquisition cost of $3,000 per acre. To this one must add the costs of site preparation, transmission and distribution facilities, and relocation expenses. One recent report which evaluated the feasibility of land treatment in Prince George's County developed a capital cost estimate of $173.7 million for a 92 mgd installation which requires 18,690 acres. If one scales down the capital costs based upon the land requirements developed in this section, the estimated cost becomes ($173.7 million) x $\frac{6,250}{18,690}$ or $58.1 million. An alternative approach would be to scale down the capital costs of the Bechtel Report based upon flow: ($173.1 million) x $\frac{25 \text{ mgd}}{92 \text{ mgd}}$ or $47.2 million. Thus, one might use the above figures to estimate the capital costs for a 25 mgd land treatment would lie in the range of $47.2 million to $58.1 million. The capital cost estimate for the AWT alternative for the Piscataway plant is estimated at $31,840,000.

Based upon the Bechtel Report, it is estimated that the annual operation and maintenance costs of AWT would be about $1,386,000 and land treatment would be about $978,000. Based upon these figures and those derived above, one could derive a crude present worth analysis.

Using an interest rate of 7 percent, an operating life of 20 years with no salvage value, land treatment costs of $47 million, and AWT costs of $32 million, one would get the following values: present worth of AWT of $46.8 million and $57.4 million for land treatment. If one were to assume that the initial expenditure in land of $18,750,000 would have a salvage value at least equal to its initial purchase price, that the AWT and land treatment systems had a useful life of thirty years, and all capital invested initially depreciated at a straight line rate, the present value of the costs for a twenty year operating life would be as follows: for AWT, approximately $44 million and for

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[1] Lower Potomac Basin Wastewater Facilities Study - Volume I prepared for the Maryland Environmental Service by Bechtel Incorporated, November, 1972.

land treatment, approximately $50 million. Varying the interest rates, the value of land, and the useful lives of the projects does not substantially change the relative attractiveness of AWT as a cost effective solution.

CONCLUSIONS

The preceding pages have attempted to set forth the general advantages and disadvantages of land treatment of wastewater effluents. While the prospect of producing a high quality effluent and recycling of nutrients without having to deal with an increased sludge disposal problem is attractive, the unsuitability of soils in southern Prince George's County for spray irrigation of wastewater effluent, coupled with the resultant high cost, renders this alternative unacceptable.

It should be pointed out, however, that, although in this instance EPA has found land treatment to be unacceptable, EPA Region III generally considers land treatment of wastewater a viable and attractive alternative to advanced wastewater treatment processes and thus feels it deserves serious consideration when favorable natural conditions (e.g., soils) are present. Consequently, it is recommended that WSSC, Prince George's and Montgomery Counties, the State of Maryland, and all other governmental authorities in the D.C. Metropolitan Area give serious attention to this method of wastewater treatment in their wastewater management planning.

In addition, it is recognized that the D.C. Metropolitan area is representative of what the famed ecologist Howard T. Odum concluded, noting that urban growth drains swamps and paves over the farmlands which once absorbed sewage:

> "As a consequence, special tertiary waste treatment becomes necessary, and monetary and energy drains are diverted from useful works to works that were formerly supplied free. If growth is so dense that environmental technology is required, then it is too dense to be economically vital for the combined system of man and nature...For example, there is rarely an excuse for tertiary treatment of sewage because there is no excuse for such dense packing growth that the natural buffer land cannot be a good cheap recycling partner."

Therefore, it is further recommended that this method of wastewater treatment and its land requirements be incorporated into local and regional land use planning, thereby not precluding this alternative in future wastewater management decisions.

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[1] "Of Human Waste and Human Folly" by Jeff Stansbury; "The Living Wilderness" Spring 1974.

III.E. CONVENTIONAL ALTERNATIVES FOR ACHIEVING AWT.

The following is a summary of conventional alternatives for achieving AWT. A more detailed discussion and evaluation is presented in Appendix E.

1. Unit Processes.

a. Phosphorous Removal.

The biological process for phosphorus removal will not be able to reduce concentrations to the desired levels (96%) by itself. However, this process may be economically desirable in conjunction with chemical precipitation of phosphorus. Chemical precipitation would require heavy chemical dosage, resulting in additional sludge disposal problems. The biological process could reduce these problems by reducing the phosphorus concentration sustantially before chemical treatment. This could reduce the amounts of chemical needed and the volume of sludge created.

b. Nitrogen Removal.

Biological treatment, air stripping, ion exchange, and breakpoint chlorination can all achieve degrees of nitrogen removal. Biological treatment is the only process which can reduce nitrogen in any form to the level required (85%) and appears to be a reasonable alternative. Breakpoint chlorination could also provide adequate nitrogen reduction. Because of many limitations (noted in Appendix E), air stripping and ion exchange do not appear to be feasible.

c. Organics Removal.

Both physical-chemical and biological processes are reasonable alternatives for the removal of organics and are evaluated in Appendix F.

d. Effluent Polishing.

Micro screening, multi-media filters, coarse media filters, moving bed filters, activated carbon, ozonation, and polishing ponds were considered as alternatives. It appears that either multi-media filter and/or carbon absorption may be the most desirable alternative, dependent upon the treatment scheme used. Additional information is provided in Appendix F.

e. Disinfection.

Chlorination is the only disinfection process which has demonstrated its ability to efficiently and economically disinfect wastewater. Additional information is presented in Appendix F.

2. Treatment Systems.

Two treatment systems were evaluated as feasible treatment alternatives: an independent physical chemical plant (IPC) and a three stage biological plant (TSB). A detailed description of these processes appears in Appendix F.

Evaluation of the two treatment and disposal alternatives included considerations of capital and operating costs, and the use of the existing facilities. The opportunity of utilizing the existing equipment makes TSB the more attractive alternative with respect to total capital and annual costs. Future expansion plans however, should consider both the TSB and IPC approaches with consideration given to using the model 5 mgd AWT plant. Since the breakpoint chlorination process would remove only ammonia nitrogen (IPC system), additional evaluation may be required to determine the ability of the process to reduce total nitrogen levels. This would be dependent upon the form nitrogen is in at the head of the plant.

III.F. SLUDGE TREATMENT AND DISPOSAL[1].

A sewage treatment process consists of removing particulate matter and soluable pollutants directly from the influent or converting it from one form to another and then removing it from the carrying water. The matter is then returned to the air or placed in or on the ground, or in water.

The particulate matter is removed from the system as a wet sludge which is an unstable compound. Processed properly, the material does have value as a soil conditioner; and, while not as concentrated as many chemical fertilizers, it can be used as a source of nutrients.

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[1] Note: The term "disposal" is used in a general sense, recognizing, as was previously discussed, that the environment is a closed system thus making it impossible to "dispose" of anything.

1. Sludge Treatment.

A number of processes are available for treating sewage sludge and are discussed in Appendix F. As was previously discussed in Section I.B., the existing Piscataway facility has incinerator capacity for 30 mgd AWT sludge and is the proposed method of sludge treatment. However, upon the request of EPA, WSSC has developed a contingency plan for sludge treatment and disposal which consists of two phases. The first phase (interim phase) consists of anaerobic/aerobic digestion with land application. This method is presently being used at the existing facility until the WSSC incinerator testing program has been completed. If the incinerator testing program indicates there may be a possible public health hazard as the result of routine and continuous operation of the incinerators, then the second phase of WSSC contingency plan would be implemented, which consists of the installation of anaerobic digestion capacity with land application of the stabilized sludge.

This represents WSSC's proposal at this time. However, a number of other sludge treatment alternatives are presently being investigated. A Supplement to this Final EIS will be issued when the testing and analysis are completed. WSSC's correspondence with EPA, concerning their contingency plan is presented in Appendix K.

2. Sludge Disposal.

Generally, there are three available disposal methods for sludge: (a) disposal into the same or another body of water after processing; (b) application on the land as a soil conditioner or fill; and (c) since the sludge in this case is largely organic in matter, disposal by incineration, leaving a residual innocuous ash.

a. Disposal in Water.

During the development of the proposed action, several of the alternatives were considered, including disposal in water. Digested sludge may either be disposed of in a river or at sea, depending on the distance to the disposal sites and constraints placed on such disposals. The main advantages of disposal in water are the ease, economy and efficiency if the disposal sites are nearby. The disadvantage is deterioration in quality of the receiving body of water, which far outweighs the advantage of this alternative. Overboard disposal, therefore, is a self-defeating alternative due to current stringent water quality standards. The Ocean Dumping Act of 1972 (PL 92-532) calls for studies and investigations for the purpose of determining means of minimizing or ending all dumping of materials within five years of the Act's effective date. In addition, current EPA policy in Region III dictates that no new ocean dumping permits will be issued. Consequently, this alternative is not considered desirable.

b. Land Application.

Wherever feasible, the aim should be to dispose of sewage sludge by agricultural utilization, particularly if suitable areas of land are available close enough to the sludge digesters. Disposal of sludge directly onto the surface of the ground represents an inexpensive method that could provide beneficial value to the soil or farmland. However, the potential for groundwater pollution is a dubious question at this time, necessitating further study.

Sometimes, where direct application of the sludge for agricultural use is not economical or practical, the sludge may be buried or landfilled at a state approved landfill site. Once again, this is an economical and feasible method of sludge disposal which requires a relatively small capital investment and provides a final and complete disposal.

Subsurface disposal is a suitable method only for sludges that have been stabilized so no decomposition or nuisance conditions will result.

However, its major disadvantages may include high capital costs.

As was discussed earlier, WSSC has been land applying digested sludge at the Bevard Farm with apparent success, and is in the process of obtaining more acreage at this site (Appendix K).

c. Sludge Incineration.

Sludge incineration offers the best weight and volume reduction of the sludge treatment process which can handle various types of sludges. Up until recently, incineration was thought by some to be the answer to the sewage sludge treatment and disposal problem, however, with recent fuel shortages and the greater awareness of possible dissemination of hazardous materials (lead, mercury, ect.) from the incineration stacks, greater caution requiring much more research, is being taken, especially in metropolitan areas.

However, various preliminary tests have shown very low emissions of hazardous materials from the newer, more advanced incinerators and indications are that these incinerators can obtain adequate hazardous material removal efficiencies. Fuel and power requirements, are again, the primary disadvantage.

Heat treatment and pyrolysis (discussed in Appendix F), may prove to be acceptable alternatives in the future, but more experience in the operation and the design of these systems is necessary. Fuel and power requirements are, again, the primary disadvantage.

III.G. EFFLUENT DISPOSAL.

1. Discharge to the Piscataway Embayment.

The Piscataway Creek Embayment is a shallow tidal bay which offers poor mixing and assimilation of pollutants. Although past and present wastewater discharges have had "minimal" impact on the marshland area of the Bay, increased eutrophication has occurred in the lower reaches.

The water quality of the Bay is highly dependent upon the water quality of the Potomac Estuary. This condition is the result of the low fresh water in flow to the Bay when compared to flows attributed to tidal action. Improved water quality to Piscataway Bay is anticipated as planned improvements to wastewater treatment plants which discharge to the Potomac Estuary are completed. However, tidal action in the Bay results in a lack of movement of pollutants from the upper end of the Bay; therefore, drastic reductions in nutrient loadings would be required if the Piscataway Wastewater Treatment Facility were to discharge to the upper portion of the Bay.

Table 17 presents the maximum allowable loadings to the Piscataway Creek Embayment.

TABLE 17

MAXIMUM ALLOWABLE LOADINGS TO PISCATAWAY CREEK EMBAYMENT[1]

Wastewater Flow MGD	Maximum UOD Load (lb/day)	Maximum Phosphorus Load (lb/day)	Maximum Nitrogen Load (lb/day)
24	10,000	35	120
49	11,000	50	170
79	12,000	65	270

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[1] "Water Resource - Water Supply Study of the Potomac Estuary", Technical Report 35, EPA - 1971.

The reduction of nutrients required to comply with these allowable loadings is not attainable under present technology. This alternative is therefore not acceptable.

2. Discharge to the Potomac Estuary.

The proposed action includes the construction of a 108-inch outfall pipe to the Potomac Estuary which traverses Piscataway Park. An evaluation of the alignment of the proposed outfall pipe by the National Capital Parks is presented in Appendix J. Alternatives to the alignment and pipe size are discussed below.

a. Alternative Alighment.

The alternative of installing the transport conduit under the Bay from the Piscataway Facility to the Potomac Estuary has been considered. This would involve dredging approximately 300,000 cubic yards of bottom sediments instead of the 30,000 that would be generated by the proposed action. The environmental impact associated with a dredging and disposal operation of this magnitude, even assuming the quality of dredged material to be identical, would be difficult to justify in terms of the environmental impacts avoided. However, these sediments would undoubtedly contain much higher percentages of organic matter, benthic organisms and even heavy metal concentrations, all of which contribute significantly to the magnitude of the impact. The impact on the human inhabitants in the area would be greatly reduced by pursuing this alternative, since the entire oepration would take place in the waters of the Bay, thus saving many trees. However, the impact of the construction phase of this alternative on the aquatic quality of the Bay, on the recreational boating pursuits enjoyed by those using the marina located in the Bay, and the loss of some part of the existing marshland in the upper end of the Bay represents an equal or more severe impact than those generated by the proposed action. The trade-off is the reduction in magnitude of the impacts to which the residents in the area are subject, as compared to the increased magnitude of the dredging and disposal operation. In conclusion then, the proposed action represents significantly less short- and long-term environmental impacts on the entire environment than those that would be generated by this alternative.

b. Alternative Effluent Pipe Size.

The Draft State of Maryland Potomac-Metropolitan Area Basin Water Quality Management Plan proposes that the Piscataway facility will be expanded to serve the Anacostia River Basin for Montgomery and Prince George's County. Population and wastewater flow projection are presented in Section II.G. of this statement. The draft plan also proposes that the outfall line, to be constructed under this project, be capable of handling year 2000 flows by gravity.

Zone II of the Potomac River as defined in EPA Technical Report 35 can receive the following maximum allowable loadings:

Ultimate Oxygen Demand	190,000 lb/day
Nitrogen	5,800
Phosphorus	1,500 lb/day

The Lower Potomac Basin Wastewater Facilities Study, prepared by Bechtel Incorporated for the Maryland Environmental Service, determined that the loadings rated above would have the following flow limitations on advanced wastewater treatment plant discharges to this zone:

Ultimate Oxygen Demand	2,000 mgd
Nitrogen	350 mgd
Phosphorus	900 mgd

The flow determinations were based on the final effluent pollutant concentrations contained in Table 18.

TABLE 18

FINAL EFFLUENT POLLUTANT CONCENTRATION

Pollutant	Final Effluent (mg/l)
BOD_5	3.0
Phosphorus, Total	0.2
Nitrogen, Organic	1.5
NH_3	0.0
$NO_2 + NO_3$	0.5
Total Nitrogen	2.0

The allowable nitrogen loading is the most stringent restriction to Zone II wastewater discharges. Two major wastewater treatment plants are planned to discharge to Zone II of the Potomac River. They are Piscataway and Lower Potomac. The ultimate capacities of these plants according to best available information are 212.4 mgd (WSSC higher estimate) and 108 mgd respectively. Therefore, the total potential ultimate discharge to Zone II would be 320.4 mgd, which is less than the 350 mgd indicated in the Bechtel Study (Nitrogen limitation). Pilot plant studies at Blue Plains for the nitrification-denitrification process indicate that the total nitrogen effluent concentration used to derive these flow limitations (3 mg/l) is achievable. In fact, if properly operated, lower effluent concentrations may be possible.

It should also be noted that the Lower Potomac Plant discharges to Pohick Creek and is subject to Virginia embayment requirements which will limit the nitrogen concentration in the plant effluent to 1.0 mg/l when technology is available. If the Lower Potomac Plant achieves this effluent concentration and the Piscataway plant maintains an effluent nitrogen concentration of 2.0 mg/l, then at ultimate flows, 4,442 lbs/day of total nitrogen would be discharged to the river compared to the allowable discharge of 5,800 lbs/day nitrogen. It is reasonable to assume that the degree of nitrogen removal indicated will be achievable by the time ultimate flows are realized.

Table 19 illustrates the effect of Zone I-c nitrogen loadings on Zone II assuming a flow in the Potomac River of 310 cfs and total nitrogen effluent concentrations of 2.0 mg/l. It should be noted that the loadings indicated for Zone I-c are based on what is achievable under today's technology, not the allowable Zone I-c nitrogen loadings indicated in Technical Report #35. These are in excess of the requirements and therefore represent an overloading of Zone I-c. This was done to determine the effects on Zone II under the most adverse conditions foreseeable. As Table 17A indicates, the nitrogen criteria for Zone II of 0.4 mg/l will be met using WSSC's higher flow projections for the Piscataway Plant. Improved technology and anticipated higher nitrogen removals for the Zone I-c treatment plants and the Lower Potomac Plant should insure compliance to Technical Report #35, nitrogen criteria for Zone II. It is therefore possible to discharge any wastewater flow, up to WSSC's ultimate flow estimate at Piscataway, without violating Zone II criteria.

The size of the effluent pipe for this project will therefore depend upon cost and environmental impacts resulting from construction. Cost estimates for various effluent pipe sizes are presented in Table 20. Table 21 presents costs for relief sewers to handle projected year 2000 flows (WSSC's projection - 152.1 mgd). The proposed outfall pipe for this project is discussed in Section IV.A. and consists of a 108-inch pipe costing $8.1 million dollars. The cost figures indicate a considerable reduction in initial costs could be realized if a smaller line were constructed. However, if the planned increases in Piscataway capacity occurs, total cost for the initial line plus a relief line (Table 22c) would be 31 percent to 40 percent higher than the proposed project.

TABLE 19

EFFECT OF ZONE I-c NITROGEN LOADINGS ON ZONE II

	1980	1990	2000	ULTIMATE
[1]Total Wastewater Discharges to Zone I-c (mgd)	371.9	386	400.5	430
[2]Total Nitrogen Discharge to Zone I-c (lbs/day)	6203	6438	6680	7172
[3]Nitrogen transport from Zone I-c to Zone II (mg/l)	0.12	0.13	0.13	0.14
[4]Total Wastewater Discharges to Zone II (mgd)	56.4	127.2	202.1	320.4
[2]Total Nitrogen Discharged to Zone II (lb/day)	941	2122	3371	5344
Nitrogen Concentration resulting from Zone II discharges	0.04	0.1	0.15	0.23
Total Nitrogen Concentration in Zone II (Zones I-c and II contractors) (mg/l)	0.16	0.23	0.28	0.37
Nitrogen Criteria Set by Technical Report 35 (mg/l)	0.4	0.4	0.4	0.4

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[1] Total of project flows from Blue Plains, Arlington and Alexandria.

[2] Assuming effluent concentration of 2.0 mg/l total nitrogen.

[3] For Potomac River Flow of 310 cfs.

[4] Total of Piscataway and Lower Potomac projections.

The National Park Service evaluated the alternative of constructing more than one line in an incremental fashion which would serve the demand as it occurs (Appendix J). The Park Service concluded that disturbance to the Piscataway Park on a one time basis would have less of an impact than the construction of multiple lines.

The construction of a smaller outfall line initially is unrealistic for the following reasons.

(1) The best planning information available indicates that the Piscataway plant will be expanded in the future. This plan is feasible with regard to water quality objectives;

(2) Considerable increased costs will be realized if a second line is required; and,

(3) The construction of more than one outfall line will have a more serious negative impact on Piscataway Park.

It should be noted and emphasized that any proposed expansion of the Piscataway plant and effluent discharge must undergo a NEPA review and be subject to an additional NPDES permits.

3. Other Alternatives.

Other feasible alternative effluent disposal techniques which have been evaluated in lieu of the proposed method consist of:

a. Deep Well Injection.

A deep well may be defined as a well located in a formation far below the surface and isolated from any fresh water strata.

Deep well disposal is best used for concentrated, toxic, radio-active, or odoriferous waste produced in an area of limited stream flow.

Fundamentally, the method consists of storing the unusable water in the pores of a formation already containing unusable waters. Since this concept is not within the scope of solving this area's water quality problems, deep well disposal has been rejected.

b. Shallow Well Injection.

The shallow well injection method does provide a more useful benefit for the disposal of wastewaters. Shallow wells are more economical to drill and maintain than deep wells and they serve to recharge groundwater supplies. However, total comparative costs between this method and the proposed method of disposal, as well as taking into consideration the possible degradation of potable water supplies from toxicants and pathogens, has led to its rejection.

In assessing the feasibility of well injection in this case, the EPA's Administrator's Decision Statement No. 5; Subject: EPA Policy on Subsurface Emplacement of Fluids by Well Injection (reproduced in Appendix K), was consulted and utilized in the evaluation of this alternative.

c. Land Disposal.

This alternative has been discussed, in part, in Section III.D. The existing geologic and soil conditions in the vicinity of the Piscataway Facility are not conducive to massive applications of effluent due to high water tables and relatively poor permeability. In addition, the existing groundwater supply potential would be susceptible to contamination in the case of malfunction.

TABLE 20

CONSTRUCTION COST ESTIMATES

Q avg. = 30 mgd

Q peak = 60 mgd

pipe size = 60"

16,800' @ $168 plf = $2.82 Million
1,500' @ $800 plf = 1.20 "
Total $4.02 "

Q avg. = 60 mgd

Q peak = 120 mgd

pipe size = 78"

16,800' @ $234 plf = $3.93 Million
1,500' @ $900 plf = 1.35 "
Total $5.28 "

Q avg. - 117 mgd

Q peak - 234 mgd

pipe size - 96"

16,800' @ $336 plf = $5.64 Million
1,500' @ 1000 plf = 1.50 "
Total $7.14 "

TABLE 21

RELIEF LINE COSTS*

YEAR 200 DESIGN FLOW

I.	
60" pipe installed 1975 -	$ 4.02 million
102" pipe required in 1980	
cost - $10.20 million (1980) (present worth) -	7.32 million
Total Project Cost (present worth)	$11.34 million
II.	
78" pipe installed 1975	$ 5.28 million
90" pipe required in 1985 -	
cost - $11.42 million (1985) (present worth)-	$ 5.88 million
Total Project Cost (present worth)	$11.16 million
III.	
96" pipe installed 1975 -	$ 7.14 million
60" pipe required in 1992	
cost - $10.82 million (1992) (present worth) -	$ 3.50 million
Total Project Cost (present worth) -	$10.64 million

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*(Based on escalation rate of 6% and a discount rate of 6.875%)

IV. PROPOSED ACTION

As previously mentioned in Section I.C., the proposed action is composed of two separate projects -- installation of 30 mgd AWT facilities (Figure 4), and construction of an outfall sewer designed to convey treated effluent to the main channel of the Potomac Estuary (Figures 6 and 7).

IV.A. DETAILED DESCRIPTION OF THE PROPOSED UPGRADING AND EXPANSION OF THE PISCATAWAY WASTEWATER TREATMENT FACILITY TO 30 MGD AWT.

The following project description has been generally extracted from the applicant's environmental assessment entitled "Environmental Impact Statement for the Advanced Waste Treatment Addition -- WSSC Piscataway Plant -- Prince George's County, Maryland" which was prepared by the consulting firm of Wapora, Inc.

1. Subparts.

a. Treatment.

The proposed project consists of the installation of advanced wastewater treatment facilities at the existing WSSC Piscataway Wastewater Treatment Facility. The work includes treatment processes for nitrogen removal, phosphorus removal, suspended solids removal (filtration), chlorination, and effluent aeration. In addition, modifications would be made to the existing 30 mgd secondary plant to provide 75-80 percent biological phosphorus removal with chemical phosphorus removal backup. A "Process Flow Diagram" is shown in Figure 21.

After receiving pretreatment consisting of screening and aerated grit removal in existing units, the wastewater would enter four existing primary settling tanks for the removal of settleable solids.

The effluent from these tanks would flow to the existing aeration tanks for the removal of carbonaceous matter and phosphorus. The existing aeration tank, of approximately 5.8 million gallons volume, would be restructured to provide the plug flow configuration required for the high degree of phosphorus removal, which is part of this project. The wastewater would then pass to four existing secondary clarifier units for the first stage clarification. Under full load conditions of 30 mgd average daily flow, the average efficiency of BOD and phosphorus removal for the first stage biological treatment is projected to be 75-80 percent.

WASHINGTON SUBURBAN SANITARY COMMISSION
PROCESS FLOW DIAGRAM
THREE-STAGE BIOLOGICAL-CHEMICAL TREATMENT

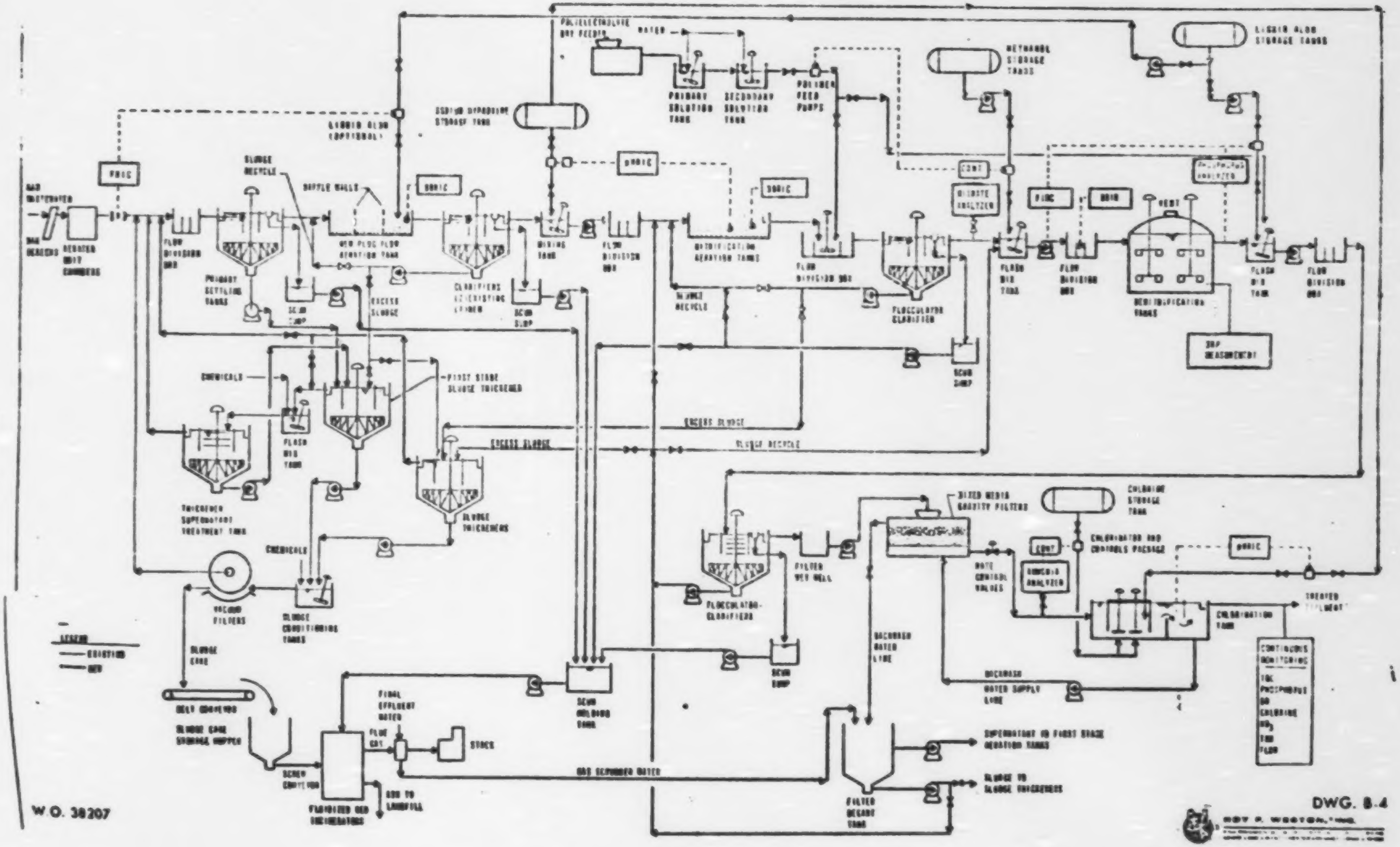

Figure 21

This flow diagram has been extracted from the April, 1972 Roy F. Weston, Inc. report entitled "Concept Engineering Report - Advanced Wastewater Treatment - Piscataway Treatment Plant."

Figure 21

The effluent from the first stage clarifiers would enter two new aeration tanks for nitrification. Each aeration tank would have a capacity of 2.9 million gallons, and would be divided into four equal compartments. A bacterial culture capable of achieving the first stage of biological nitrogen removal (nitrification) would be maintained in the tanks. After 2.32 hours detention,[1] the effluent would pass through a flash chemical mixer which is followed by flocculation then sedimentation in two new clarifiers, each 200 feet in diameter. Due to the tendency of nitrifying organisms to settle slowly, provision would be made in the design of the units for chemical addition and flocculation prior to clarification in order to ensure efficient solids separation.

From the nitrification stage of nitrogen removal, the effluent would flow into the second stage of nitrogen removal (denitrification). In this section, the wastewater would be mixed with a biological culture which converts dissolved nitrogen compounds into insoluble nitrogen gas which is stripped from the effluent by aeration and agitation. Two tanks for denitrification, each of 3.24 million gallons volume, would be provided. The effluent from the denitrification tanks would be treated with aluminum sulfate for the precipitation of the residual phosphorus in the wastewater, and would then pass through a flash mix tank to provide mixing of the chemicals and aeration for driving off the liberated nitrogen gas. The effluent would then enter two new clarifiers, each 200 feet in diameter and preceded by chemical mixing and flocculation facilities, as in the nitrification stage. The final effluent from the denitrification stage would flow through gravity sand filters to remove residual suspended solids. The filtered effluent would then be chlorinated and aerated prior to being discharged to the receiving water. The proposed effluent quality is shown in Table 22 (effluent limits for any 30-day period are reflected in the 50% column).

In the process of removing organic wastes, excess biological solids would be generated. Those solids not required in the process must be disposed of. At full loading conditions of 30 mgd, the secondary biological system would supply approximately 70 percent of the total 89,000 lbs. of solids to be disposed of in the solids handling system. Although the solids contribution of the tertiary system by weight is of secondary importance, the solids are somewhat dilute. If incineration is pursued as the mode for sludge treatment and disposal of the advanced wastewater treatment solids, four new sludge thickeners, each 55 feet in diameter, and three new vacuum filters, each 750 square feet in surface area, will be added. In addition, a separate thickener

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[1] Flexibility is allowed to double detention time during cold weather by operation of two parallel tanks, each of 2.32 hours detention.

TABLE 22

PROPOSED ATTAINABLE EFFLUENT QUALITY
(Design Basis)

	Probability of Occurrence	
Constituent	50 Percent[1] mg/L	90 Percent[1] mg/L
BOD_5	5	10
P	0.2	0.3
N	3.0	5.0
UOD	16	28

[1] Percent of the time that the actual value is equal to or less than the given value.

This Table has been extracted from the April 1972 concept engineering report prepared by Roy F. Weston, Inc., for Piscataway Advanced Wastewater Treatment.

and vacuum filter are being added to dewater incinerator ash, and a flocculator clarifier is being provided to treat thickener overflows and vacuum filter filtrates prior to their recycle to the main facilities. The new units would be fully integrated with the existing plant to provide flexibility of operation.

The second and third stages of biological treatment would be constructed wholly on existing WSSC properties and at the site of the present Piscataway Wastewater Treatment Facility. (Figure 4). The new tanks and facilities would be primarily located southwest of the existing first stage biological waste treatment systems (Photo 12), immediately east of the existing lagoons. New sludge handling facilities would be constructed adjacent to the existing sludge dewatering and incinerating facilities (Photo 4). Above ground structures would include a new control building, a sludge dewatering building (Photo 4), a chemical feed building, and a maintenance building (Photo 5). The existing sludge incinerator building, approximately 60 feet high (Photos 3 and 4), would be the tallest structure in the expanded plant. Ash concentration facilities are constructed below grade.

The Washington Suburban Sanitary Commission reports that the following quantities of chemicals would be consumed during plant operation at design capacity.

TABLE 23

QUANTITIES OF CHEMICALS REQUIRED DURING FACILITY OPERATION

Chemical	Purpose	Quantity Required
Lime	Sludge Conditioning and pH Adjustment	1,100 lbs./day
Ferric Chloride	Sludge Conditioning	5,000 lbs./day
Methanol	Carbon and Energy Source for Denitrifying Organisms	1,700 gallons/day
Alum	Phosphorous Precipitation	3,500 lbs./day
Chlorine	Effluent Disinfection	5,000 lbs./day
Polymer	Sludge Conditioning	800 lbs./day

Chlorine is probably the only chemical in the above list for which a supply problem could occur. Inquiries directed to a major chlorine manufacturer revealed that although there is a chlorine supply problem at present, several chlorine production plants in the 1,000 to 1,200 tons per day class are due to come on line in the immediate future and should relieve the chlorine supply situation.

WSSC reports that electric power consumed at the existing Piscataway Wastewater Treatment Facility ranged from 637,000 to 905,000 kilowatt-hours per month during 1973. They predict that the power requirement for the 30 mgd advanced wastewater treatment facility would be 3,480,000 kilowatt-hours per month at full capacity. The power would be supplied to the plant by the Southern Maryland Electric Cooperative.

There has been some question concerning the disposition of the 5 mgd model advanced wastewater treatment facility. WSSC reports that they plan to continue the operation of the model plant as a research facility for physical/chemical treatment. Since the Commission expects to build and operate a physical chemical plant in Montgomery County, Maryland, they can obtain valuable operating experience at Piscataway which will prepare their operating staff for the challenges involved in operating the large scale physical/chemical installation which is proposed for Montgomery County.

There are several recently imposed requirements that must be satisfied by each new construction grant applicant. Applicants have little experience in dealing with these new requirements and there may be some delay encountered before the requirements are satisfied. For example, each applicant applying for a grant after July 1, 1973, must demonstrate that the sewer system discharging into the proposed treatment works is not subject to excessive infiltration/inflow. At the least, the applicant must conduct an infiltration/inflow analysis to identify the presence, quantity, and type of infiltration/inflow conditions which exist in the sewer systems. This analysis is currently being conducted by WSSC. Should the results of the sewer system analysis show that the system is subject to possible excessive infiltration/inflow, the applicant must conduct a sewer system evaluation survey.and then develop a program of remedial works.

b. Effluent Disposal.

The following description of the effluent discharge pipe has generally been extracted from the "Environmental Impact Assessment for Installation of a Conduit to Transport Effluent from the Piscataway Waste Treatment Plant to the Potomac River Estuary" prepared for WSSC by Wapora, Inc. The action under consideration is the installation of a 108-inch diameter buried pipe line which, as designed, would transmit by gravity up to 325 mgd (peak flow) or 152.5 mgd average daily

The proposed 108-inch pipeline would be able to accommodate under gravity flow conditions, all the future effluent flows from the Piscataway Facility if the 125 gallon per person flow estimates are realized or to the year 2000 if WSSC estimates are realized (see Tables 14A, 14B and Appendix K). The force main type construction of the line will allow it to serve ultimate flow projections if WSSC's estimates are realized. According to the best information available, the installation of the 108-inch pipe appears to be the most advantageous of all alternatives evaluated (see Alternatives. Effluent Disposal, Section III-G). The underlying reasons for installing a 108-inch pipeline now, instead of installing a smaller pipe sized to accommodate only the present flows or a little larger are as follows: first, the disruption to Piscataway Park and the Potomac Estuary, in terms of aesthetic and environmental impacts (described in Section IV.B. and C.) as a result of the construction activities of installing the pipe, should be limited to a one time occurrence; second, economics and sound engineering practices favor the installation of one larger pipe now than smaller pipes incrementally as need arises.

The treatment plant is situated on a 313.2-acre tract of land located on the southerly side of the Piscataway Bay and at its most easterly end (Figure 4). It is bound on the east by Indian Head Highway and on the south by Farmington Road. The proposed pipeline would begin approximately 300 feet east of the west property line of this tract of land and follow in a westerly course, roughly paralleling the southern bank of the Bay at a distance varying from 1,000 to 3,000 feet to the south of it. The right-of-way of the proposed pipeline is shown on Figures 6 and 7. Construction of the line would begin at the shore of the Potomac Estuary and proceed towards the Piscataway facility.

(1) The Land Operation.

The total length of the buried pipeline would be 16,300 feet. The initial 300 feet would be on property owned by the WSSC. It would then traverse in a westerly direction over a number of privately owned tracts of land for a distance of 5,500 feet. At this point, the line would enter a tract of land owned by the U.S. Government and would continue in a westerly direction for a distance of approximately 2,200 feet, thence

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[1] Piscataway Park

entering private property again for a distance of some 4,500 feet still in a westerly direction. From there it would again enter Piscataway Park land and turn in a northwesterly direction for a distance of approximately 3,800 feet to the banks of the Potomac Estuary. Approximately 6,000 feet of the buried pipeline would traverse U.S. Government-owned property and 10,300 feet will traverse private property.

Slightly less than 20 acres of land is involved in this portion of the project. Approximately 13 acres would lie within the boundaries of a 50-foot right-of-way which has been acquired by the WSSC through successful negotiation with the owners of ten privately-owned tracts of land. The balance of less than 7 acres is presently U.S. Government-owned land. WSSC is presently negotiating for a permit from the National Park Service for the right-of-way to cross this land.

The pipeline would following the general contour of the land, maintaining the necessary cover and grade to permit the treated effluent to flow by gravity to the main channel of the Estuary. The construction plans for the pipeline follow a well-established construction procedure recognized by the American Society of Civil Engineers. WSSC will implement a set of Environmental Specifications (see Appendix K) in addition to their "Sediment Control Permit for Utility Construction", the requirements of which are listed below.

(a) All excavated material shall be protected to prevent erosion and to avoid silting of adjacent areas, storm sewers and/or streams.

(b) Critical slopes associated with the easements shall be stabilized and protected from surface water runoff.

(c) Water handling devices such as, diversion or interceptor dikes, flexible nylon tubing, and bituminized fiber pipe shall be used to provide temporary erosion control during construction in drains, roadside channels and other drainage easements when field conditions indicate they are needed.

(d) Stream crossings whether of access ways or utility lines shall be of a "permeable" nature. Obstructions shall not be left in the stream beyond the period of project construction.

(e) Stream channels shall be protected from storm drainage discharges by using energy dissipators, rip rap, etc. Storm drains shall be outletted in a location and direction, so as not to disrupt a natural channel or interfere with the use of adjacent properties.

(f) Any necessary channel improvement work shall be done in accordance with the requirements of the Water Resources Administration.

(g) No debris or obstructions shall be left unstabilized in floodplains beyond the period of project construction.

(h) The method of construction in floodplains shall provide for daily protection of all disturbed areas.

(i) Any cross-drainage through floodplains shall be safely channeled through disturbed areas to protected outlets.

(j) Clearing shall be kept to a minimum.

(k) Top soil shall be stripped over disturbed area and stockpiled for reuse.

(l) Designated trees shall be protected from damage. All trees barked or scarred during construction shall receive prompt repairs in accordance with the "Standards and Specifications, Section 3.800."

(m) All backfill shall be mechanically tamped to a minimum of 90% of the Maximum Dry Density, as determined in accordance with AASHO Method T-99. Should the moisture content of the excavated material be such that the specified density cannot be accomplished, the backfill shall be mechanically tamped to remove all voids and minimize settlement.

(n) All material deposited on public thoroughfares shall be immediately removed.

(o) When the season permits, all disturbed areas shall be vegetatively stabilized immediately following construction. At all other times, use one of the following: mulching, temporary seeding, sodding, or prepare the seedbed with lime, fertilizer, mulch, tie-down as specified for seeding then over seed the area during the next regular seeding season.

(p) All seeding and final restoration shall be in accordance with the State "Standards and Specifications for Soil Erosion and Sediment Control in Urbanizing Areas," Section 3.100.

(q) Construction shall not impair existing surface drainage, constitute a potential erosion hazard or act as a source of sedimentation to any adjacent property(s) or watercourse(s).

The initial activity would be to clear the land to the extent necessary to accommodate the excavation, store the excavated material and prepare access roads for the transport of men and materials from existing roads serving the area. The 50 foot right-of-way would be utilized for this purpose in addition to being used for the pipe location. The bulldozer used to implement this phase would be followed by excavating equipment. As the trench is opened to th necessary depth, the pipe laying operation would begin. This would require pick and shovel work to provide the correct grade and assure good support of the pipe, followed by placement of the pipe by crane. In order to mitigate the possibility of damaging any artifacts, the WSSC would instruct the project control inspectors to halt work in any areas where artifacts are discovered and to notify qualified archaeologists of the discovery. The National Park Service will require a qualified archaeologist to be on the site during the entire excavation process. After necessary protective measures are taken, work would then proceed. Erosion will be kept to a minimum. In addition, most of the fields are relatively flat and the predominant vegetation is annual grasses and crops which can easily and quickly be reseeded. Final leveling and coupling of the pipe would be followed by the backfill operation. The last step of landscaping and seeding would involve light equipment and manual labor for the most part. The pipe would be reinforced concrete for its entire length, and all pipe joints, manhole covers, air reliefs, and accessories would be watertight pressure fittings so that the pipe can be operated as a pressure conduit and provide additional capacity to accommodate needs that may arise in the future.

Disposal of excess earth, undergrowth and trees removed during the clearing operation would be the responsibility of the contractor and carried out in accordance with WSSC's "Standards and Specifications for Soil Erosion and Sediment Control in Urbanizing Areas". The land portion of pipeline is expected to require 8 to 10 months for construction.

(2) The Marine Operation.

The outfall line would extend to approximately 1,440 feet in a northwesterly direction beneath the shallows of the Potomac Estuary, ending on the southeastern edge of the main channel just south of Mockley Point. Its installation would take place for the most part in the Estuary.

The top of the pipe would be approximately 24 inches below the estuarial substrate, thereby avoiding future interference with navigation or potential damage to the pipe. The initial phase of work would be to excavate a trench in the bottom sediments in which to place the outfall line. This dredging operation would require lifting bottom sediment into a barge which would transport it to an established disposal area at Dyke Marsh, (depicted on Figure 3), which is presently being restored under the auspices of the National Park Service. Although Dyke Marsh has not yet been prepared to accept dredged material, it is anticipated that the National Park Service will have made all necessary preparations by the time actual dredging is taking place.

Before any dredging or spoil disposal can be conducted, the WSSC must obtain a permit from the U.S. Army Corps of Engineers. In their review of permit applications, the Corps in consultation with other Federal interests, including EPA, considers the possible environmental effects of the project, to those related to water quality. At the present time, on-land disposal is planned, however, if open water disposal would become an alternative, this office would request that the applicant sample and analyze the sediments for various parameters. The purpose of this testing would be to determine if any adverse water quality would occur and, if so, to determine its relative magnitude. EPA would then review and comment on the WSSC's permit proposal and, if necessary, request that they alter the disposal method to provide adequate water quality safeguards. A copy of the Corps of Engineer's Public Notice on WSSC's Permit Application is contained in Appendix K.

The State of Maryland's Water Resource Administration has issued WSSC a Wetlands License which prohibits construction in the Potomac Estuary during the period of March 1 through November 1, in order to minimize possible adverse impacts on the migratory, spawning, and feeding activities of various important sport and commercial fish species (see Section II.E.3.). In addition, National Capital Parks has prohibited any construction activity in the Piscataway area which would deter the view from Mount Vernon during the Bicentennial Year. These restrains, coupled with the four to five month anticipated construction requirement for the outfall line, delays completion of the line until mid-1978. Consequently WSSC and EPA have requested National

Capital Parks and the Water Resources Administration to modify their respective restrains in order to allow WSSC to construct the outfall line during the period from September 1, 1975 through January, 1976; thereby allowing the completion of the outfall line two years earlier than would be otherwise possible. This matter is presently being resolved and correspondence concerning this matter is included as an attachment to Appendix J.

(3) Piscataway Permit Review Procedure.

Under the Federal Water Pollution Act Amendments of 1972, all persons discharging wastes into the navigable waters of the nation must apply for and obtain a Discharge Permit (National Pollution Discharge Elimination System - NPDES). An application has been submitted by WSSC to discharge wastes from the Piscataway Wastewater Treatment Facility.

The primary purpose of this permit program is to ensure that all wastes being discharged meet all applicable State and Federal effluent and stream quality standards. The Piscataway NPDES application will be reviewed in this light. The application on hand requests permission to discharge 30 mgd of AWT effluent into the Potomac Estuary mainstem, and an implementation schedule to obtain the adequate effluent quality.

Before a permit is drafted and issued, the WSSC proposed effluent quality and quantity will be evaluated with respect to existing water quality standards and Enforcement Conference requirements. The proposed schedule will also be compared with existing schedules available in Construction Grant files, Enforcement Conference recommendations, and State approved management plans to ensure a minimum elapsed time for completion of needed facilities.

The permit, if issued, would contain interim effluent limits and final effluent limits to authorize, as well as regulate, the interim flows prior to completion of the final treatment facilities. The proposed final effluent limits are presented in Appendix K.

If the effluent quality or quantity varies from that proposed in the permit application or the issued permit, then WSSC must submit a new application seeking prior approval from EPA and the State of Maryland for such an alteration in discharge.

As a condition of the issued permit, WSSC will be required to monitor and report on the effluent quality, quantity, and the progress being made on the approved implementation schedules. These periodic reports will be required on a monthly and/or quarterly basis through the life of the permit, for a maximum of five years. (After five years, all permits must be reviewed and re-issued even if no effluent changes are proposed).

c. Sludge Disposal.

(1) General Status. The proposed project submitted by WSSC in their grant application, as was indicated in Section IV.A.1.a., calls for the incineration of sludge in the existing fluidized bed sludge incinerators which were constructed as part of the 25 mgd secondary treatment expansion project (Photos 3 and 11). However, due to the situation surrounding the incinerators (discussed in Section I.B.), the method of sludge treatment and disposal has not been conclusively determined. At this time, it appears this decision depends on a number of factors, such as, the satisfaction of the Prince George's County Council Resolution (Appendix K) prohibiting the operation of the incinerators[1] and/or the approval of the Prince George's County Council, and the results of an intensive testing program proposed for the Piscataway incinerators. The testing program proposed by WSSC, which was also referred to earlier in the EIS would be conducted by Batelle Columbus Institute and the University of Maryland in cooperation with EPA, has not been started as was originally planned, due to the temporary prohibition on the operation of the incinerators as a result of the reported elevated blood lead levels in some children in March, 1974. It is stated in Section I.B. that, upon analysis of stack tests taken by the EPA National Environmental Research Center, Research Triangle Park, North Carolina (RTP), EPA conclusively feels that there was no relationship between the reported elevated blood lead levels and the intermittent operation (73 hours over three months) of the Piscataway incinerators. Therefore, it is the opinion of EPA that no danger to public health would result from the operation of the incinerators for testing purposes. However, EPA will not approve the operation of the incinerators on a routine basis unless the results of the proposed WSSC testing program conclusively confirms previous tests and shows that no possible danger to public health would result from the routine operation of the incinerators. The proposed testing program is outlined in Appendix A.

The Draft EIS recommended that, due to the then "oil shortage", WSSC develop a contingency plan for sludge treatment and disposal in the event #2 fuel oil became non-available. As a result of possible public health dangers of the incinerators, the contingency plan took on additional meaning and therefore, EPA (during the review period of the Draft EIS) requested WSSC to develop a two-phase contingency plan for sludge treatment and disposal. The first phase would provide an interim method for treatment and disposal of the secondary sewage sludge (now being produced) during the period of time the incinerators are being adjusted, tested, and analyzed, and if necessary, would carry over for the period of time it would take to implement the second phase of the contingency plan. The second phase of the contingency plan would provide a permanent alternative to incineration for sludge treatment and disposal in the event the Piscataway incinerators were found to be a possible hazard to the public health and their operation therefore prohibited. WSSC has developed such a contingency plan and it is discussed later in this Section, and outlined in Appendix K.

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[1] It should be noted that it is questionable whether or not the Prince George's County Council has the legal authority to prohibit WSSC from operating the incinerators, however, at the same time, it is highly unlikely that WSSC would not comply with a County resolution.

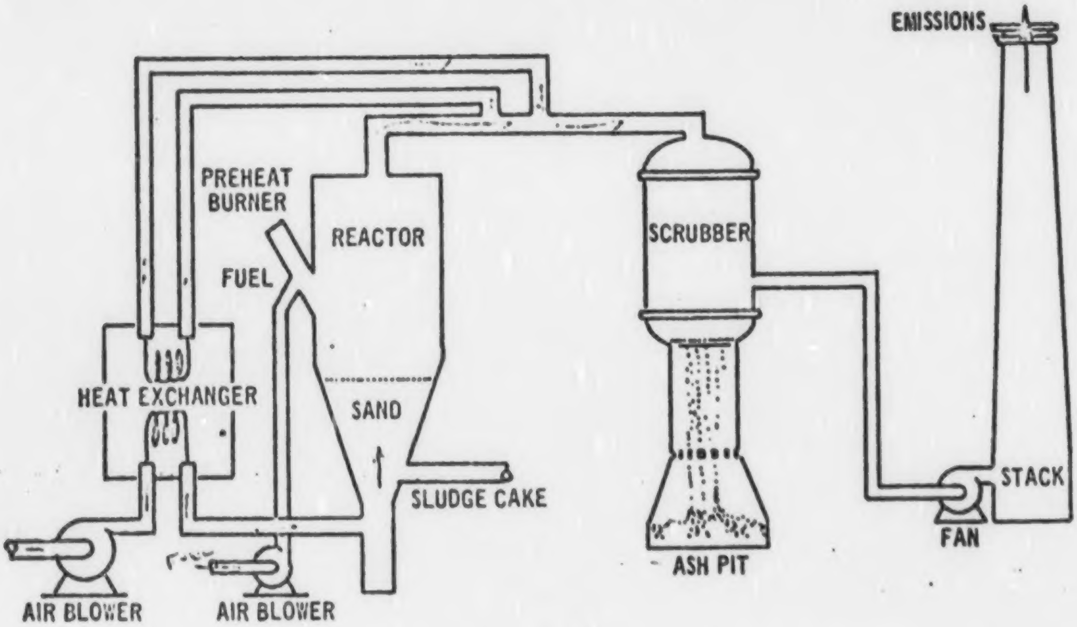
The sludge treatment and disposal situation at Piscataway, being as it is, EPA recognized the need to provide a mechanism which would permit immediate action on the AWT additions and the effluent discharge pipe to the Potomac Estuary, and now allow the sludge treatment and disposal problem to delay what was originally the proposed project and the purpose of this EIS (AWT additions and effluent discharge pipe). EPA, therefore decided not to wait the six to nine months for the completion of the incinerator testing program in order to issue the Final EIS, but elected to publish the Final EIS on the AWT additions and effluent discharge pipe while deferring its conclusions on the mode by which the sludge would be treated and disposed of until the incinerator testing program is completed. At that time, EPA will issue a Supplement to this Final EIS, which will contain the test results, their analysis and evaluation, and the decision as to whether incineration or the second phase of WSSC's contingency plan will be implemented for sludge treatment and disposal. It is, therefore, EPA's position that these two actions (AWT additions/effluent pipeline and sludge treatment and disposal) can and should be acted on separately at this time, in order to avoid increased inflationary costs and continued water pollution resulting from a six to nine months delay and possibly even a two year delay if construction is further delayed by the Bicentennial Year construction prohibition in the Piscataway area.

Because WSSC's extensive incinerator testing program has not been completed, the first phase (or interim method) of the WSSC's contingency plan will be implemented. Basically, it calls for the continuation of sludge stabilization by anaerobic digestion with land spreading at the Bevard Farm (discussed in Section I.B.). In addition, WSSC plans to convert one existing aeration basin (which is currently not being used) into an aerobic interim sludge digestion basin, thus giving WSSC an aerobic/anaerobic sludge stabilization process. Based on current usage, there is enough suitable land at the Bevard Farm for about 14 more months of utilization of the stabilized sludge as soil enrichment, at the rate of about 50 dry tons/acre. Additionally, WSSC has negotiated with other property owners which indicate the availability of additional land sites (320 acres) for sludge utilization as is needed. These sites have been evaluated by the Prince George's County Health Department and have been approved for use. Finally, WSSC is also pursuing several methods or uses of the stabilized sludge other than land spreadings, such as fill or cover material for sanitary landfills and the inclusion of WSSC sludge in the MES program for disposal of raw sludge from the Blue Plains facility.

Consequently, this interim sludge treatment and disposal plan appears adequate to handle the sludge from the existing Piscataway facility until the testing of the incinerators is completed and a decision as to the method of sludge treatment and disposal, which will be pursued on a permanent basis for the 30 mgd AWT Piscataway facility, is made and a Supplement to this Final EIS is issued.

(2) Incineration. As was previously indicated, WSSC's grant application calls for the incineration of sludge in the existing fluidized bed incinerators. Approximately 89,000 lbs. of solids would be generated daily by Piscataway AWT Facility when operating at 30 mgd. The primary and waste activated sludges would be concentrated to 4 percent solids in the first stage sludge thickeners (four existing and one new) and the nitrification and denitrification waste sludges would be concentrated to 2 percent solids in three second- and third-stage thickeners which are not yet constructed. The thickened sludges would be conditioned for dewatering by adding lime, ferric chloride and polymer and the conditioned sludge would then be pumped to vacuum filters for dewatering. The primary and waste activated sludge would be further concentrated to 20 percent solids on four vacuum filters (three existing and one new) while the waste sludge from nitrification and denitrification would be further concentrated to 16 - 18 percent solids on two new vacuum filters. The primary and waste activates sludge cake would be conveyed from the first stage vacuum filters to a hopper from which the sludge cake is then pumped to the fluidized bed incinerators. Similarly, the second and third stage sludge cake would be conveyed and pumped to one of the three existing fluidized bed incinerators. A typical schematic of the fluidized bed incineration process is shown in Figure 22.

The incinerators are designed to operate at a temperature of approximately 1400°F. The sludge would supply approximately half of the heat content required to support combustion at this temperature, while the other half would be supplied by a 60 gal. per hour injection of fuel oil. Each incinerator can process up to 1930 lbs. dry solids per hour of vacuum filter cake. If each of the three incinerators operated around the clock, the facility could process 138,960 lbs. of dry solids per day. This amount is comfortably above the 89,000 lbs. per day of dry solids that would be generated at 30 mgd AWT.



Controlled Fluidized Bed Reactor and Scrubber

The figure is from "Background Information for Proposed New Source Performance Standards" U. S. Environmental Protection Agency, Office of Air Quality Planning and Standards Research, Triangle Park, North Carolina 27711.

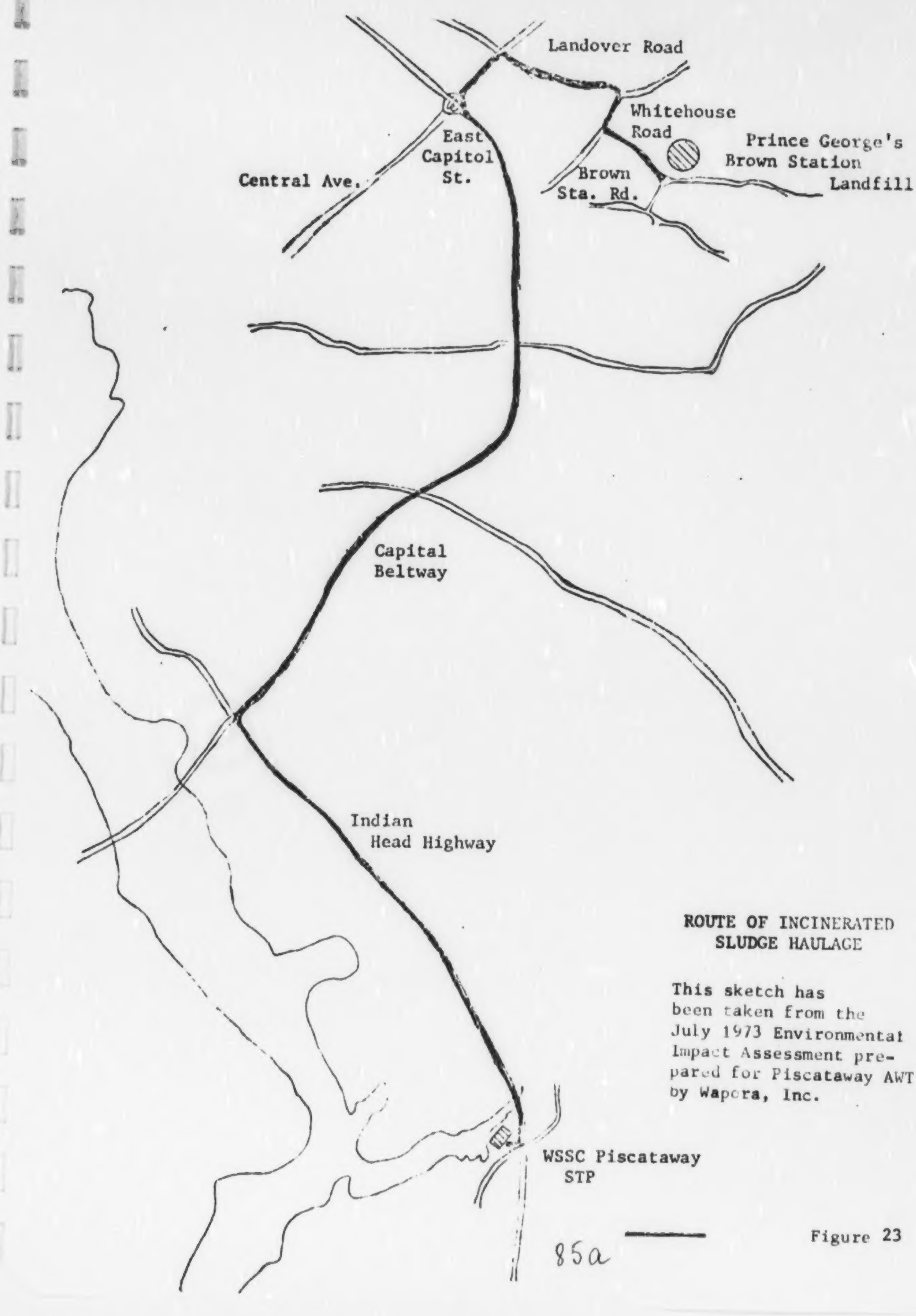
Figure 22

The incinerator flue gas would pass through a heat exchanger and then enter a venturi scrubber where the ash would be removed from the flue gas before the gas is discharged to the atmosphere. The scrubber underflow would be directed to the ash classifiers and then the ash would be discharged through a chute to a dumpster-type container. It is proposed that wastewater from the scrubber and the ash classifier would flow to one new incinerator ash thickener, where it would be concentrated to 2 - 4 percent solids content. The thickener underflow would be conveyed to one of the new vacuum filters where it would be dewatered to 20 percent solids. The incinerator ash recovered from the vacuum filter and the ash from the dumpster container would be combined and hauled by truck to the Prince George's County Sanitary Landfill at Brown's Station. The route of the trucks would be over major highway and truck roads and is shown in Figure 23. The WSSC is authorized by the Prince George's County Department of Public Works to use the Brown's Station landfill for an indefinite period pending development of a WSSC landfill for sludge disposal. The WSSC is presently investigating other possible landfill sites.

A concept engineer report entitled Advanced Wastewater Treatment - Piscataway Treatment Plant - Washington Suburban Sanitary Commission was prepared for the project by Roy F. Weston, Inc. This report stated that the incineration facilities were designed to process up to 50,000 pounds per day (25 tons) of ash. This amount of ash could be moved to the landfill by one medium size dump truck making two or three trips per day. It would be a simple matter to store ash produced during each day's operation until late at night, so that the ash disposal operation would not contribute to compounding the metropolitan area's traffic congestion problems.

(3) Anaerobic Digestion/Land Application.

In the event it is determined as a result of the incinerator testing program that routine operation of the Piscataway incinerators would result in a public health hazard, WSSC would implement the second phase of their contingency plan, which is stabilization of the raw sludge with land application of the stabilized sludge. At present, the contingency plan calls for sludge stabilization by anaerobic digestion and land spreading of the digested sludge for soil enrichment at the Bevard Farm at a rate of about 50 dry tons/acre. However, WSSC is pursuing further investigations into this method and other methods of sludge stabilization and disposal. WSSC's June 10, 1974 letter to EPA outlining their contingency plan should be referred to, and is presented in Appendix K.



ROUTE OF INCINERATED SLUDGE HAULAGE

This sketch has been taken from the July 1973 Environmental Impact Assessment prepared for Piscataway AWT by Wapora, Inc.

Figure 23

Implementation of this plan would require the construction of anaerobic digestion capacity, dewatering facilities and all other associated required facilities to include land disposal areas necessary to implement this method of sludge treatment and disposal. Depending on the results of the investigations referred to above, the Supplement to this Final EIS will contain a detailed description and evaluation of the mode for sludge treatment and disposal.

(4) Anaerobic Digestion/Land Application/Incineration.

If, in the event the incinerator testing program would reveal that the incinerators operate at a very high degree of efficiency (removal) but, on the other hand, no conclusive evidence can be given that no adverse public health effects would result from the routine operation of the incinerators, a combination of anaerobic digestion and incineration could possibly be pursued. This would encompass utilizing anaerobic digestion with land application as the primary mode of sludge treatment and utilization with incineration acting as a back-up during those periods of the year when land application is not most desirable.[1]

Again, all of these alternatives will be evaluated in the Supplement to this Final EIS.

2. How the Proposed Project Meets the Goals and Objectives Discussed in Section I.

Section I presented the proposed action as an element of the "Action Program" that was developed by the Potomac River Enforcement Conference. The proposed action appears to satisfy the objectives set forth by the Enforcement Conference and appears to be compatible with the long range goal of the Conference, which is to clean up the Potomac Estuary.

3. Cost Estimates.

Cost estimates for each phase of the proposed action are shown in Table 24. These estimates have been developed by the WSSC, in conjunction with their grant application, and have been incorporated into this document without review. To this date, EPA has not officially received an update to these cost estimates, however, it is anticipated that these estimates are now on the low side. Therefore, their inclusion at this point in no way constitutes acceptance of the amounts shown on the estimates.

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[1] The Prince George's County Council recently (July, 1974) adopted a resolution embodying a so-called "balanced system" of sludge use/disposal. Correspondence concerning this is included in Appendix K.

The cost figures shown in Table 24 are estimates - or predictions - rather than actual bid prices. If the proposed action is implemented at some point in the future, various competing contractors would submit bids for portions of the work and then the owner would be expected to enter into contract with the lowest responsible bidder.

If the proposed action were implemented, it is likely that the total project cost of $39,993,900 would be financed as follows:

Source	Percentage	Amount
Federal Construction Grant	75%	$29,995,400.
State Grant	12 1/2%	4,999,237.
Local Share (WSSC)	12 1/2%	4,999,263.

The local share is included in the expenditures which are planned for in the "Prince George's County Ten Year Water and Sewer Plan and Six Year Capital Improvements Program of the Washington Suburban Sanitary Commission", and since these expenditures are a portion of a large, long-range program, any rate increase that develops is usually not attributable to any single project such as the proposed action.

PISCATAWAY ADVANCED WASTEWATER
TREATMENT PLANT - 30 MGD
PRINCE GEORGE'S COUNTY, MD.
W.S.S.C. PROJECT 96.1

TABLE 24

BREAKDOWN OF COST

SUMMARY OF CONSTRUCTION COST

ACTIVATED SLUDGE PROCESS		
Modification to Aeration Tanks		$ 43,500
NITRIFICATION PROCESS		
Low Lift Screw Pumps (3)	$ 218,400	
Nitrification Tanks (2)	3,849,000	
Mixing/Flocculation Tanks (2)	584,400	
Clarifiers (2)	1,629,000	
Sludge Recycle Pumps (5)	154,000	
		6,434,800
DENITRIFICATION PROCESS		
Denitrification Tanks (2)	3,142,000	
Mixing/Flocculation Tanks (2)	584,000	
Clarifiers (2)	1,626,000	
Sludge Recycle Pumps (5)	153,600	
		5,505,600
FILTRATION/CHLORINATION PROCESS		
Sand Filters Building (includes Chlorine-contact chamber & filters backwash sump)	3,112,000	
Backwash, Filter Decant, & Utility Supply Pumps	85,700	
Post Aeration Tank/Final Lift Pump Station	825,000	
		4,022,300
SLUDGE FACILITIES		
Sludge Thickeners (5)	484,000	
Supernatant Treatment Tank	161,900	
Sludge Pump Stations No. 3 & 4	238,200	
Vacuum Filters (4)	585,000	
Sludge, Scum Filter Cake Transfer Pumps	273,500	
		1,742,600
CHEMICAL FEED FACILITIES		
Storage/Mix Tanks	340,500	
Feed/Transfer Pumps	125,100	
		465,600

TABLE 24 (cont'd)

BREAKDOWN OF COST (Continued)

BUILDINGS		
Control Building	$ 805,500	
Chemical Building	520,500	
Dewatering Building	795,000	
Maintenance Building	298,300	
Gate House	13,700	
		$ 2,433,000
YARD PIPING		1,294,000
SITE WORK		911,200
INSTRUMENTATION		1,501,300
ELECTRICAL		2,845,700
TOTAL ESTIMATED CONSTRUCTION COST		$27,200,000

PROJECT PERIOD COST (ELIGIBLE)

ARCHITECTURAL/ENGINEERING BASIC FEES	$ 1,904,000
OTHER ARCHITECTURAL/ENGINEERING FEES	16,000
CONSTRUCTION AND PROJECT IMPROVEMENT COST	27,200,000
CONTINGENCIES	2,720,000
TOTAL	$31,840,000

TABLE 24 (cont'd)

BREAKDOWN OF COST

PISCATAWAY EFFLUENT LINE

Wages & Salaries O&M:

353 Manhours per year

Breakdown of Cost:

Construction

108" 1500 ft. @ $927 per linear feet -	$1,390,500
108" 16,800 ft. @ $331 per linear feet -	$5,560,800
	$6,951,300
Architectural/Engineering Basic Fees	486,590
Other Architectural/Engineering Fees	20,880
Contingencies	695,130
Total Eligible for Grants	$8,153,900
R/W	37,000
Total Project Cost	$8,190,900

4. Operating Personnel.

Treatment Plant - The present Piscataway Wastewater Treatment Facility Staffing, as determined by a recent Federal-State Operation and Maintenance inspection, is as follows:

Category	Number
Superintendent	1
Operator	18
Laboratory Personnel	3
Maintenance Personnel	2
Other	4
Total	28

All of the employees reported above are engaged in plant operation or maintenance on a full-time basis. The superintendent and three of the operators are reported to be certified. A preliminary estimate of plant staffing for 30 mgd AWT is shown in Table 25.

The WSSC reports that the outfall line would be maintained by their system maintenance division which has projected the following annual resource outlays for operation and maintenance of the line:

Wages, Salaries, etc. (353 manhours)	$1,410/yr.
Materials, Supplies, and Services	$320/yr.
Transportation, Machinery, Equipment	$230/yr.
Administrative and General	$300/yr.
	$2,260/yr.

TABLE 25

ESTIMATE OF STAFFING FOR THE PROPOSED 30 MGD AWT FACILITY AT PISCATAWAY

TITLE	NUMBER	SHIFTS REQUIRED	TOTAL
Plant Engineer	1	1	1
Chief Plant Operator	1	3	4
Floating Operator	2	3	8
Chem. Bldg. Operator	1	1	1
Vacuum Filter Bldg. Operator	2	3	8
Incinerator Operator	1	3	4
Sludge/grit Operator	1	2	2
Bldgs. & Grnds. Supt.	1	1	1
Bldgs. & Grnds. Foreman	2	1	2
Bldgs. & Grnds. Crewman	10	1	10
Mechanical Supervisor	1	1	1
Mechanical Technician	3	1	3
Electrical Supervisor	1	1	1
Instrumentation Technician	5	1	5
Chemist	1	1	1
Laboratory Assistants	4	1	4
Security	1	3	1
	Total		57

IV.B. Environmental Impact of the Proposed Action.

1. Impact on Vegetation and Wildlife.

The proposed construction of the AWT facilities would result in the complete removal of most of the undergrowth and immature trees in the unoccupied area of the WSSC property. However, since the majority of the vegetation at the site is undergrowth and immature trees, the long-term impact would be minimal. Approximately 30 trees exceeding 40 feet in height located in a wooded area along the east boundary would have to be removed. The small creek and its bordering vegetation would be affected over much of its length, due to the location of the new facilities. Much of its remaining length within the WSSC property would be pipe and channelized. The proposed arrangement, however, would minimize visibility of the facilities from residential areas across Farmington Road. A landscape architect has been retained by WSSC to develop a landscape plan to include peripheral forestation, which would diminish the visibility of the new facilities from all other directions.

The buried pipeline, in general, would avoid woodlands and pricate dwellings by traversing cleared areas where possible (see Figure 6). This would minimize the impacts on the woodlands in favor of impacting the cleared crop and pasture lands. The right-of-way for the proposed pipeline encompasses less than 20 acres of land. Approximately 6,000 feet of the 50-foot right-of-way portion occupies wooded area, of which 5,000 feet is privately owned. The remaining 10,300 feet would pass through crop or pasture land.

The major impact of the buried pipeline would be encountered in the wooded areas. Here, the land must be cleared of underbrush and trees for a 40 to 50 foot width with no selective preservation within 15 feet of the centerline of the pipeline being possible. However, selective preservation of some larger trees beyond 15 feet of the centerline is possible. In addition, a great amount of effort and coordination between WSSC and the Park Service was taken in locating the alignment of the effluent pipe through Piscataway Park, in order to avoid, as much as possible, woodlands and private dwellings.

The excavation activity and the associated noise would dislocate some of the birds and small burrowing animals, causing them to move elsewhere. However, the number and kinds of wildlife to be permanently affected is not anticipated to be significant, thus not resulting in a change in the existing terrestrial ecosystem.

The proposed excavation would also expose the soil to potential erosive forces, however, the proposed action is expected only to cause very minor problems in the fields crossed by the pipeline, since most of the fields, whether fallow or cultivated, are relatively flat and are not prone to erosion. Additionally, the predominant vegetation is composed of annual grasses or crops which can be replanted or would even reseed themselves within one year. WSSC will enforce the requirements of their "Sediment Control Permit for Utility Construction", which are listed in Section IV.A.1.b. and will also implement the Environmental Specifications, presented in Appendix K, in order to mitigate the impacts on the excavated areas.

The construction of the outfall line in the Potomac Estuary involves the removal of approximately 40,000 cubic yards of estuarial substrate by dredging. This would result in the loss of benthic organisms supported by the estuarial substrate over an area of about 2 acres. Some benthic organisms would be lost by direct removal of the dredged materials, and others by the possible breaking of the food chain resulting from reduced water quality due to increased turbidity. However, turbidity is a temporary impact and shortly after the pipe is installed, new organisms would inhabit the area. Dredging activities will be avoided as much as possible during the period of April through October, in order to minimize any adverse impacts on migratory, spawning, and feeding activities of the various important sport and commercial fish species described in Section II.E.3. However, due to construction restrains described in Section IV.A.1.b.(2)., WSSC is requesting that construction of the outfall line be permitted during the period of September 1, 1975, through January, 1976, in order that the outfall line be completed two years earlier than would otherwise be possible. The resultant adverse impacts of this action are considered to be minimal as compared to the large monetary savings and environmental benefits which would result from the completion of the proposed project two years earlier. This matter is presently being resolved.

The impact of the proposed effluent discharge on the tidal marshes along the shore of Piscataway Park is difficult to predict. Dye studies done by the Chesapeake Technical Support Laboratory of the Federal Water Pollution Control Administration[1] reported that no direct intrusion of dye into Piscataway Bay was observed when dye was released at a depth of 40 feet at the proposed outfall pipe location. After two tidal cycles, however, intrusion of dye, around Mockley Point and approximately one-third of a mile into the Bay was confirmed and identified as being a well-mixed dye similar in concentration to that in the Potomac Estuary and not as a "slug", which was observed when dye was released on the surface of the Estuary.

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[1] Potomac-Piscataway Dye Releases and Wastewater Assimilation Studies; Norbert A. Jaworski and James Johnson, Jr. Technical Report No. 19 December, 1969.

Even though these studies indicate that Estuary water from the vicinity of the proposed outfall pipe may generally concentrate around Mockley Point and extend approximately one-third of a mile into Piscataway Bay, no alterations of the Park's wetlands, as a result of changing water quality by discharging 30 mgd of AWT effluent, are anticipated. This conclusion is based on the high quality of the AWT effluent, tidal actions, the mixing of the AWT effluent with Estuary water, and the relatively small amount of effluent as compared to the large quantity of Estuary water. It should be pointed out, however, that the potential for this impact increases as the quantity of AWT effluent discharged increases. Therefore, it is recommended that the impacts on the Park's wetlands be thoroughly investigated in conjunction with any plans to increase the AWT effluent discharge beyond 30 mgd, to include a complete evaluation of extending the outfall pipe farther down the Potomac Estuary, in order to avoid or lessen potential impacts on the Park's shoreline. It will be EPA's policy not to fund any expansion or to grant a discharge permit which would allow an increase of AWT effluent discharge (beyond 30 mgd) without such investigatons. It is further recommended that these wetlands be carefully monitored during the operation of the proposed project in order to confirm the conclusions perviously stated.

Adverse effects on the aquatic biota resulting from residual chlorine in the effluent are not anticipated. As was indicated in Section IV.A.1.a., approximately 5,000 pounds of chlorine will be used daily for effluent disinfection. The treatment plant is designed for a 1 ppm total residual chlorine effluent concentration where the effluent enters the 108-inch discharge pipe. WSSC reports that the residual chlorine will primarily (90%) be in the form of monochloramines and the remainder in the form of free chlorine and dichloramines.

The recent emphasis on environmental protection and public health and welfare has resulted in a tremendous increase in the use of chlorine for disinfection of water. Recent investigations on the effects of residual chlorine on the aquatic ecosystem have concluded that residual chlorine, under certain conditions and concentrations, is fatal to aquatic biota. According to Brungs[1], several major studies are now underway and when completed, should greatly clarify the effects of residual chlorine. However, it is known that the toxicity of residual chlorine depends on its concentration and the relative proportions of free chlorine and chloramines. Free chlorine is more toxic than chloramines, monochloramines are less toxic than di- or trichloramines, and residual chlorine is more toxic at lower pH. Taking into account these factors along with the relatively small quantity of effluent discharge compared to the quantity of Potomac Estuary Water, tidal actions and resultant mixing of the effluent with Estuary water, no significant adverse effects on aquatic biota are anticipated from chlorine residual. In addition, supplemental de-chlorination of the effluent will undoubtedly occur as the effluent flows through the 108-inch discharge pipe on its way from the treatment plant to the Estuary. The chlorine residual of the effluent at the discharge point cannot be accurately determined, but it is anticipated that it will be slightly below the design chlorine residual concentration of 1 ppm.

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[1] "Effects of Residual Chlorine on Aquatic Life:, William A. Brungs, Journal of Water Pollution Control Federation October, 1973.

The State of Maryland has indicated that they would desire a total residual chlorine effluent concentration not to exceed .5 ppm. WSSC is presently investigating the feasibility of obtaining a .5 ppm chlorine residual without affecting fecal chloriform kills.

Due to the increasing awareness of possible adverse effects on aquatic biota resulting from high chlorine residual concentrations, it is recommended that, if monitoring of the Potomac Estuary reveals any significant adverse effects resulting from chlorine residuals from the Piscataway effluent, WSSC implement additional de-chlorination of the Piscataway effluent.

The proposed effluent outfall line will be located a great distance from any productive shellfishing waters, therefore, no adverse impact is anticipated on commercial shellfish waters.

No constrictions at the end of the outfall pipe resulting from deposits of silt and sediment due to the relatively low volume of flow from the proposed pipe, is anticipated. The outfall pipe will not be constructed on the bottom of the Estuary channel and, in addition, daily peak discharge flows will keep the end of the outfall pipe free of any deposits.

Adverse effects of scouring and turbulence will not occur as a result of the proposed discharge, however, any future increase in the quantity of discharge may pose this possibility and will be evaluated at such time. (The present design does not preclude the possibility of extending the outfall line downstream or the installation of diffusers.)

The disposal of the dredged material in Dyke Marsh would take place on land, and with proper dyking would not affect water quality. As was already indicated, Dyke Marsh is being restored under the auspices of the National Park Service, and although it has not yet been prepared to accept dredged material, it is anticipated that the National Park Service will be prepared to accept the dredged material from this action by the time dredging operations begin. The dredged material would aid in the restoration of Dyke Marsh.

A more detailed evaluation of the environmental impacts on the vegetation and wildlife of the proposed 108-inch pipeline across Piscataway Park was performed by National Capital Parks, National Park Service, and is presented in Appendix J.

2. Impact on Water Quality.

As was already indicated, the construction of the proposed 108-inch outfall pipe into the Potomac Estuary would result in a temporary adverse impact consisting of increased turbidities during the dredging operation. Construction of the effluent pipe through Piscataway Park would not result in any significant ground water changes.

Expansion of the Piscataway Wastewater Treatment Facility to 30 mgd AWT would make possible the connection of the pollution load presently being discharged into Tinker's Creek and Piscataway Creek from secondary sewage treatment plants at Andrews Air Force Base and the Naval Reservation. Since both of these sources contribute a substantial proportion of the pollutant loadings to these creeks, diversion of these flows would significantly improve water quality in Tinker's Creek and reduce nutrient loadings to the Bay. Improved conditions within the Bay, however, could be reduced because Potomac Estuary water would occupy more of the Bay due to decreased freshwater inflow into the Bay. Consequently, a greater flushing time of the Bay would ensue, and Potomac Estuary water carrying some of the load from the Piscataway Facility, would enter into the Bay as was shown by the dye studies of Jaworski and Johnson (1969). Therefore, the discharge of 30 mgd AWT effluent to the Potomac Estuary would tend to improve the water quality in the Bay, but this would be offset, at least in part, by nutrients and biological oxygen demands entering the Bay from the Potomac Estuary. It is anticipated that the water quality of the Potomac Estuary will improve as the other treatment plans which discharge to the Estuary are upgraded.

The discharge of 30 mgd of wastewater from the Piscataway AWT Facility will not violate water quality standards and is well within the allowable loadings limits established in Technical Report #35 for Zone II of the Potomac Estuary. In fact, according to the best information available at this time, possible expansion of the Piscataway Facility to its projected ultimate capacity of approximately 152 mgd (in accordance with the Draft State of Maryland Potomac-Metropolitan Area Basin Water Quality Management Plan), in terms of water quality, is a viable alternative for wastewater treatment in the Potentially Serviceable Area (see Section III.G. Alternative: Effluent Discharge).

In the event the incinerator testing program reveals that routine operation of the incinerators could result in a danger to the public health, and WSSC pursues the second phase of their sludge treatment and disposal contingency plan, there is the possibility of ground water contamination resulting from the land application of the stabilized sludge at the Bevard Farm. In addition, there are a number of other potential impacts which could occur if the contingency plan is implemented, such as: the dissemination of pathogens; nitrate buildup; and the accumulation of heavy metals. However, with proper management and monitoring, these factors could be controlled or prevented. Therefore, it is recommended that a monitoring program be developed and implemented for the interim phase of WSSC's contingency plan and be continued if the second phase of the contingency plan is implemented.

3. Impact on Air Quality.

The Piscataway Facility includes an incinerator system for the burning of sludge. Total design loading of the three-unit incinerator for a 30 mgd plant flow is 64,000 pounds per day (dry weight) for primary and secondary sludge. This increases to a total of 89,000 pounds per day (dry weight) for advanced water treatment. Paragraph c in Section IV.A.1. and Appendix A should be consulted for a more complete description of the incinerator's specifications and ultimate disposal of incinerated ash.

An analysis of predicted gaseous and particulate emissions reveals that operation of the incinerator would not appreciably degrade ambient air quality near the facility or within the Air Quality Control Region. Specifically,

a. SO_2 emissions would be negligible because sludge sulfur content is primarily non-combustible sulfates;

b. CO emissions would not be appreciable because of combustion control for oxygen;

c. Essentially all organic compounds would be destroyed; and

d. Neither atmospheric emissions nor residue ash offer a potential source for contamination from pathogens.

Results of limited stack sample tests performed by the EPA National Environmental Research Center during January through March, 1974 (total of 73 hours) indicate that emissions of lead are at a level too low to present any danger of health effects (approximately 4 grams per day). Total particulate emissions are very well controlled (greater than 99.9 percent), and are readily below Federal standards for new sludge incinerators (although the Piscataway incinerator is not a new source as defined by regulations). Appendix A discusses the results of these preliminary findings and the possible revisions to the National Emissions Standards for Hazardous Air Pollutants regulating Hg emissions from sewage sludge incinerators.

Appendix B summarizes a diffusion analysis of annual average concentrations of lead and mercury as a result of design-level operation of the Piscataway incinerator. The results indicate that rather high levels would occur very close to the plant, on the plant site, with a rapid attenuation of concentrations as distance from the site increases. A comparison of the predicted lead and mercury concentrations with the associated health effects, as discussed in Appendix C, indicates that as a contributor to annual average ambient levels, the Piscataway incinerator should not present a health hazard.

Two caveats concerning the air quality impact of the incinerator are important: (1) If the plant is ultimately expanded to 95 mgd or greater and sludge incineration is expanded proportionately, the potential for significant localized air quality effects would increase, and (2) annual average concentrations within safe ranges do not necessarily imply that occasional episodes of high concentrations would not occur. Consequently, if the sewage facility is expanded to 95 mgd or greater, alternative means of sludge disposal other than incineration may be required. The state of the art of incinerator technology will, of course, also be an important consideration should expansions of this magnitude be made. In addition, it was recommended in Section V of the Draft EIS that due to fuel shortages, WSSC develop a contingency plan for sludge disposal to be implemented if fuel oil supplies become critically short. In response to this, and due to the alleged elevated blood lead levels (section I.B.), WSSC has developed such a contingency plan (Appendix K) as was discussed in Section IV.a. The implementation of this contingency plan is based on the results of WSSC's planned incinerator testing program. The results of the testing programs, outlined in Appendix A, and its evaluation will be presented in a Supplement to the Final EIS.

It should be emphasized, as it was earlier in the EIS, that EPA conclusively feels that no adverse public health effects will occur as a result of the operation of the incinerators for testing purposes. If the incinerator tests do not confirm preliminary results of no public health effects resulting from the operation of the incinerators on a routine basis, EPA would not allow their operation, at which time WSSC's contingency plan (phase 2) would be implemented.

To date, this plan calls for anaerobic digestion with land application of the stabilized sludge. Since no incineration would be permitted, impacts on air quality would be minimized. However, the transportation of the digested sludge by truck to the Bevard Farm could result in even greater lead emissions than what would result from the operation of the incinerators! However, this and all other environmental concerns surrounding the sludge treatment and disposal problem will be thoroughly analyzed in the Supplement to this Final EIS when the incinerator testing program is completed. At that time, the most acceptable and environmentally sound sludge treatment and disposal method will be pursued.

4. Impact on Aesthetics, Archeology and History.

The construction of additional treatment facilities at the Piscataway site and the effluent outfall pipe to the Potomac channel cannot be accomplished without change to the landscape. Further, it is conceivable that archeological sites which have not yet been discovered could be damaged during earth-moving activity. However, several steps are planned (and required by construction permit) which, if thoroughly executed, would minimize the possibility of substantial permanent physical degradation at the site and along the right-of-way.

Specifically, the following steps are being taken because of aesthetic and archeological considerations at and near the project site:

a. Architectural style for buildings at the treatment plant is red-brick Colonial, with extensive landscaping;

b. Conditions along the right-of-way of the outfall conduit will be completely restored, under the supervision of the National Park Service;

c. An archeologist will be available throughout the construction period to protect and study any historical evidence which may be discovered;

d. The route of the outfall conduit was chosen after an extensive tree and archeological survey, and negotiations between WSSC and the National Park Service. The proposed alignment, which traverses both Federal and private lands, avoids several thousand feet of woodland and marshland which would be destroyed if only Federal lands were involved; and

e. The outfall conduit is being constructed at a capacity sufficient for growth through the end of the century in order to avoid repeated scarring of the Piscataway Park.

The treatment plant and pipeline, during the construction period, would have a definite visual and audial impact on the visitors to Piscataway Park and, to a smaller extent, on visitors to the other nearby parks. Although, construction activities which would deter the view from Mount Vernon, will not be permitted in Piscataway Park during 1976 because of the importance of the Bicentennial celebration. However, as discussed earlier, WSSC has requested permission to continue construction through January, 1976, in order to complete the proposed project which would otherwise be delayed two years. Because January is normally a low visitation period, no significant adverse impacts on Mount Vernon or other areas are anticipated.

The particular section of the Estuary bank where the proposed outfall line enters the Estuary is presently rapidly eroding. The proposed project calls for this section of outfall right-of-way to be riprapped in order to stabilize it and prevent further erosion. However, unless the entire section of shoreline which is eroding (approximately 1300 feet) is treated in a similar fashion, the riprapped area will be noticeable from Mount Vernon. It is understood that the National Capital Parks has programmed for the eventual riprapping of this entire section of bank, however, due to low priority and insufficient funding, this work is not anticipated to be accomplished in the near future. This aesthetic impact could be mitigated, therefore, if the National Capital Parks could program their riprapping activities to coincide with the construction of the proposed action. In addition, such work conjunction could eliminate possible disruption of Piscataway Park at a later date when the remainder of the bank is riprapped.

The Maryland Historical Trust has reviewed all available information concerning the project and concluded that "the proposed route ... offers the least in the way of an adverse environmental impact.... We therefore approve the utilization of the (proposed route), on condition that a trained archeologist be available at all times in the event that any archeological site is disturbed." This condition is being required. The Maryland Historical Trust's evaluation is reproduced as an attachment to the National Park Service's report in Appendix J, and constitutes the first step in compliance with Section 106 of the National Historic Preservation Act for Maryland. This letter, along with one from the Virginia Historic Preservation Officer, have been forwarded to the Advisory Council on Historic Preservation for final review and concurrence.

5. Growth Implications.

Most public programs are designed to affect the efficiency and equity of the regional and national economies. The Environmental Protection Agency's Construction Grant Program, through which the Piscataway Facilities would receive 75 percent Federal financing, has both direct and indirect impacts on the distribution of people and activities within the Potentially Serviceable Area, as well as the Washington, D.C. SMSA. While the primary purpose and effect of such funding is to improve water quality through the provision, upgrading and/or expansion of sewage conveyance and treatment facilities, it is recognized (and the National Environmental Policy Act requires) that EPA must fully consider the range of its grants' impacts on the human environment.

The growth concerns of the suburban counties of Washington, D.C., although not unique, are certainly heightened by the extraordinary growth of the region since 1960 and the current efforts to improve the quality of the Potomac Estuary. The effect of these two trends has been a simultaneous growth in demand for housing throughout the region during an extended period of overtaxed sewage treatment facilities. The moratorium on new sewer hook-ups in the bi-county area, with the accompanying economic hardships and legal uncertainty, is a result of this situation. Prince George's, Montgomery and Fairfax Counties have each initiated attempts to bring these and other competing forces into balance[1], although it is not yet possible to know how successful such County policies will be.

The Environmental Protection Agency has neither the authority to make comprehensive development plans for local jurisdictions nor even the authority to set capital expenditure priorities for wastewater facilities. However, EPA does encourage the opportunities which are now available in the Washington area for integrating Metro transit planning, air quality planning and land use, and public facility planning. Hopefully, this integration, within the context of the Year 2000 Plan, will reverse the extensive development trends which have led to air and water quality degradation and socially undesirable land conversion. Thus, EPA would use the several review and regulatory powers it has, under the National Environmental Policy Act, Federal Water Pollution Control Act Amendments of 1972 and the Clean Air Act of 1970[1], to expand its role in bringing about more environmentally sensitive public policy and locational decisions.[2]

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[1] Section II.G. discusses the proposed staging policy in Prince George's County as an example of these attempts at increased public control. The reader's attention is invited to the July and August 1973 issues of the Central Atlantic Environmental News for interesting assessments of the directions being taken by the various Counties.

The upgrading of the Piscataway Facility and possible future expansion to provide service to the Anacostia Basin will, for the capacities planned, affect regional population distribution moreso than population totals. Further, the construction of large-capacity interceptors puts the distribution impact on the location of primary and collector sewers and transportation facilities rather than on the location and relative sizes of treatment plants. It is for this reason that special attention must be paid by EPA, and especially by local and regional agencies, to comprehensive planning and staging decisions made prior to facilities design and construction. The current proposal for 30 mgd AWT at Piscataway, by itself, does not commit or preclude development patterns in the Design of Potentially Serviceable Areas; this cannot be said of the additional regional facilities outlined in Section I.F. To emphasize the point made in Sections I.F. and IV.A.1.b., the 108-inch outfall conduit is not intended to provide for extraordinary growth in the Design Service Area. In fact, if the present 80 mgd Anacostia flows were added to the 20 mgd flows in the Piscataway-Hensen-Andrews AFB area, the 108-inch pipe under gravity conditions could accommodate only 40 to 50 mgd growth in the combined Design and Potentially Serviceable Areas through the Year 2000. Such growth represents only 40 percent growth over a period of 25 years. Of course, the distribution of this potential growth in the County will be the result of County planning and administrative policies, as well as on future public works decisions by local, State and Federal agencies, including EPA.

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[1] Public Laws 91-190, 92-500, and 91-604 respectively.

[2] EPA's authority under the Clean Air Act to approve and/or promulgate State Implementation Plans, for example, is clear and a large amount of experience in this field has been gained during the past year. EPA's use of the FWPCA Amendments in a regional development context is not as well developed at this time, although policies are presently being formulated for the exercise of such authority.

This EIS has not touched on the important issue of how the sewer moratorium and the controlled-growth policies affect the distribution of housing among the many income groups in the study area. Under conditions of scarcity, questions of equity invariably arise. Whenever a housing market experiences a shortage over an extended time period, lower-income households are hurt the most. When supply remains relatively constant as demand steadily increases (as in metropolitan D.C.), households bid against each other for the same housing units, forcing prices up. Substitutes for housing do not exist, except that lower quality housing is substituted for higher quality (there are many supply characteristics which, together, constitute housing quality). Further, housing turnover and filtration are severely constrained, at the same time that a virtual "mortgage moratorium" exists and maintenance of rental housing is undoubtedly declining. All of these related market processes are heightened by the hook-up moratorium, limiting most the housing opportunities of lower-income families.

The Military Housing Issue:

A memorandum of understanding on military housing plans in Prince George's County and sewage treatment service to Andrews Air Force Base has been negotiated by representatives of the Department of Defense (DoD), Andrews Air Force Base, the Prince George's County Council and County Executive, and the Washington Suburban Sanitary Commission (WSSC). The Memorandum is presented in Appendix K. In essence, the Understanding provides for limiting DoD military housing in Prince George's County during the fifteen (15) year planning period indicated in the DoD Facility Plan for the National Capital Region; notification of the county government of any changes in the housing plan; and, connection of Andrews Air Force Base wastewater flows to the Piscataway and Western Branch regional treatment facilities. Connection to the Piscataway Treatment Facility is conditioned upon EPA and/or State Secretary of Health's approval leading to the more complete use of the existing Piscataway Treatment Facility's capacity. The Memorandum represents a rational attempt to mesh DoD and local planning objectives.

6. Proposed Project's Consistency with Basin or Areawide Water Quality Management Plan.

The proposed upgrading and expansion of the Piscataway Wastewater Treatment Facility is in accord with the Draft Basin Plan submitted by the State of Maryland in compliance with Section 303(e) of the Federal Water Pollution Control Act Amendments of 1972. The proposed AWT facilities are in compliance with the Interstate Water Resources Program Task Force and the Potomac River Enforcement Conference recommendations. The proposed AWT facilities and construction of an outfall line are included as number 2 and 6, respectively, on the State of Maryland's priority list for Federal assistance for the construction of wastewater treatment facilities.

IV.C. ADVERSE IMPACTS WHICH CANNOT BE AVOIDED.

As was already discussed in Section IV.B., minor short-term adverse impacts are anticipated during the initial construction of the facilities. These impacts are primarily associated with construction activities and would result in increased noise levels, disruption of traffic, inconveniences to the residents, siltation of streams, disruption to wildlife and wildlife habitat, and slight decreases in ambient air quality in areas proximate to construction. However, these impacts would be minimized through sound conservation practices and contemporary construction techniques.

The construction of the 108-inch outfall pipe would result in increased turbidity at the dredging site. However, this adverse impact would be temporary in nature and would last only during and shortly after the actual dredging operation. Associated with the dredging operation would be a direct loss and disturbance of the benthic community at the dredging site. However, this also would be a temporary impact and shortly after the completion of the dredging operation, benthic organisms would re-establish in that area.

The proposed construction of both the AWT facilities and the 108-inch pipeline, would result in the temporary and permanent loss of vegetation, wildlife habitat, and the temporary susceptibility of the disturbed areas to erosion. These areas, however, are small and any adverse impacts resulting from erosion, such as sediment and aesthetics, would be insignificant and short term in nature. Those areas on the WSSC property which would have to be cleared would be replaced by actual structures (AWT facilities). Those areas which would have to be cleared for the installation of the 108-inch pipeline would be re-established with the appropriate vegetation. As was previously discussed, the route of the effluent pipe was designed in order to avoid, wherever possible, forested areas, thereby limiting the impacts on the older vegetation. In addition, in those areas where trees could not be avoided, selective preservation of the older trees will be attempted where conditions permit. The people living in the area would also be subject to a number of inconveniences and irritants attributable to construction. The increase in traffic from heavy-duty earth-moving and trucking equipment would damage the present dirt and gravel roads that are the principal means of access to the right-of-way, and would also damage to some extent the few blacktop roads that serve the area, particularly at turn-in and turn-out points. There would be concern on the part of the residents for their children in terms of the traffic problem and more importantly, the proximity of a 15- to 20-foot-deep trench that would exist during the course of the project. The construction activity would represent a new and interesting attraction to the children in the area, and even though the area is remote and sparsely populated, the potential for accidental injury would exist. In addition, the possibility of encountering rock outcroppings does exist, in which case, jackhammers would have to be used.

As was indicated in Section IV.A.1.b., however, all construction will follow well-established procedures recognized by the American Society of Civil Engineers, in addition to WSSC implementing their "Environmental Specifications" (Appendix K) and requirements of their "Sediment Control Permit for Utility Construction", all of which are designed to mitigate, to the maximum extent possible, construction impacts.

The structures which would be added to the WSSC Piscataway Facility would materially add to the size of that facility and thus have an aesthetic impact on surrounding areas. These structures would be most visible from residential areas in the Piscataway Hills district and to a lesser extent from Farmington Road. Mitigative measures for aesthetic impacts have been outlined in Section IV.B.5.

It should be recognized that the proposed action would result in increased sludge loads thus adding to the sludge treatment and disposal problem in the D.C. Metropolitan Area. If incineration is pursued as the primary mode of sludge treatment and disposal, some increased air pollution would result, although preliminary tests indicate that these emissions would be minimal, well controlled, and would not pose a threat to the public health. However, as was discussed in Sections I.B. and IV.A., WSSC, Battelle Columbus Institute, the University of Maryland, and EPA have proposed an extensive testing program (Appendix A) for the Piscataway incinerators to conclusively determine the possible impacts on air quality. The results and evaluations of the testing program will be published in a Supplement to the Final EIS. At that time, the mode of sludge treatment and disposal will be selected.

If the incinerator tests indicate that routine operation of the incinerators would result in a possible hazard to the public health, WSSC would then implement the second phase of their sludge treatment and disposal contingency plan. This would result in added cost to build the necessary facilities and increased truck traffic to haul the digested sludge to the Bevard Farm and the other land application sites. Ironically, it is possible that lead emissions resulting from the added truck traffic would be greater than if the incinerators were utilized. However, as was stated before, these considerations and impacts will be thoroughly evaluated in the Supplement to the Final EIS when the incinerator testing program is completed.

In addition, as was already discussed earlier, the increased wastewater treatment capacity would, in part, serve to accommodate future growth. Associated with this growth would be an increase in the number of the necessities and conveniences by which man lives, such as automobiles, homes, etc., all of which result in additional air pollution loads.

IV.D. SHORT TERM USES VERSUS LONG TERM PRODUCTIVITY.

The Piscataway Secondary Wastewater Treatment Facility has been in operation for several years and provides excellent BOD and suspended solids removal in the Design Service Area. In a realistic sense, the short term use of the 313-acre site is limited to wastewater treatment. Furthermore, while unsatisfactory water quality of the Potomac River prevents the Piscataway Bay from achieving significantly upgraded water quality, construction of additional AWT facilities on both sides of the Potomac River during the next several years would reflect an overall improvement of Piscataway Bay.

While in the long run, the Piscataway site could be used for any purpose compatible with its location and topography, the policy of wastewater treatment regionalization indicates that Piscataway's past investment to serve the intial Design Service Area be expanded:

1. Initially to serve Henson Creek and Andrews AFB, and

2. Ultimately to relieve Blue Plains of most or all of the Anacostia Basin flows.

The interim expansion to treat Andrews AFB prior to construction of the outfall conduit would, if carried out, exhance water quality in the upstream reaches of Piscataway Creek. The completion of the outfall conduit would, in the long term, provide sufficient effluent conveyance capacity for the entire Potentially Serviceable Area.

It is incorrect to believe that construction of the effluent line at the capacity proposed by WSSC, while many times larger than what is needed at the present time in the Piscataway area, obligates the Environmental Protection Agency to sponsor the contemplated additions identified in Section I.F. The rationale for not recommending a smaller effluent line is outlined in Section III.G.2.b. For these reasons, EPA feels that, although the possibility exists that the additional capacity in the effluent line may not be used or approved to be used, at the time expansion is proposed, the line should be initially constructed for its maximum potential capacity. In addition, each grant application from WSSC must be reviewed by several governmental agencies to ensure compatability with regional development policy and State funding priorities. Finally, in accordance with the FWPCA Amendments of 1972, each increase in effluent levels accompanying future plant expansions must be reviewed by EPA prior to the issuance of an NPDES Discharge Permit.

As was previously indicated, the proposed action is an integral part of a program initiated to clean up the Lower Potomac and its tributaries. The implementation of the proposed project, in conjunction with the other portions of the wastewater management planning for the Washington, D.C. Metropolitan Area, will fulfill the goals of the Enforcement Conference and will help provide a cleaner, healthier environment for those who live, work, and visit the area of our Nation's Capitol.

IV.E. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES.

The consequence of this proposed project would be to commit an area immediately adjacent to the existing WSSC Piscataway Wastewater Treatment Facility to a usage which would benefit the service area of that facility as well as the water quality in Piscataway and Tinker's Creeks, Piscataway Bay, and the Potomac Estuary. As there are considerable existing structures in the immediate vicinity, the project would not substantially diminish the value of the construction area since its present usage is as a wastewater treatment site.

The proposed plant expansion represents a significant addition to the existing wastewater treatment system now located within the project area. The expansion of the plant would diminish the aesthetic values of an area which is predominantly residential and recreational in nature. However, it should be recognized that these aesthetic values have already been diminished to some extent by the existing 30 mgd facilities, which, even after completion of the proposed project, would still represent the major portion of the visual impact. Existing facilities occupy over 75 percent of the area which would be taken up by the plant upon completion of this work. Due to the nature of the permanent construction, the plant expansion would represent a permanent unchanging feature of this area. New structures would permanently displace some trees; however, most of the construction would occur in open areas.

The location of the new structures would require considerable channelization and alteration of a very small creek which passes through WSSC property on its way to Piscataway Bay. This creek does not support a significant fish population, and its banks are only lightly wooded. The necessity of arranging the plant addition for proper operation and minimum visibility from areas outside the WSSC property dictates that the addition be placed as proposed, interfering with a portion of the creek.

The operation of the proposed facility would require the consumption of some non-renewable resources and chemicals. Of major importance is #2 fuel oil which is required to operate the incinerators if that method of sludge treatment and disposal is pursued. Each of the three incinerators would consume approximately 60 gallons of oil per hour. With two of the incinerators operating at all times, (the third to be used during repair and maintenance), there would be a requirement of approximately 1,051,200 gallons (25,029 barrels) of fuel oil per year. According to the Maryland Oil Heat Association, an average of 1500 gallons of fuel oil is needed per home annually for heating in this area. Therefore, approximately 710 homes could be heated for an entire year with the amount of fuel oil required by the incinerators. In addition, incineration of the sludge would be commiting the sludge to a "waste" and not to a "resource". As a resource, the sludge could be utilized, e.g., for soil conditioning, soil enrichment, land reclamation, and as a fertilizer. However, the inert residual ash resultant from incineration also can be utilized in many ways, but its nutritive value is lost.

Section IV.A.1.a. outlines the chemicals and quantities which would be required during plant operation. The labor, along with the building materials such as concrete, steel, brick, power, etc., required to construct the facilities would be consumed irreversibly.

The operation of the Piscataway Wastewater Treatment Facility would essentially divert 30 mgd of water away from the entire service area into one point of discharge in the Potomac Estuary. Although this resource would not be committed irreversibly, it should be noted that a relatively large amount of money would be invested in the outfall pipeline. Therefore, the possibility of pumping the processed water for other uses, such as the beneficial effects derived from spray irrigating the effluent on open land, would be less probable, depending of course, upon the demand for the water.

All the secondary irreversible and irretrievable commitments of resources are a direct consequence of potential new developments associated with new sewers, new highways and new potential energy supplies. When population grows, land must be developed to provide the homes, schools, stores, offices and all the other necessities and conveniences that people require.

If these developments were to take place on the aquifer recharge areas without proper precautions, there would be an irretrievable loss to the groundwater table due to the decrease in recharge areas. Similarly, if developments through the lack of proper zoning regulation enforcement were permitted to be built on the floodplains, these floodplains would not be allowed to perform their natural functions of storage during heavy rain and aquifer recharge, and there would be an irreversible loss of these natural resources.

Along with developments come new roads, new parking areas and associated nonpermeable surfaces. As these development trends increase, open spaces and their recreational resources associated with wildlife and aesthetics are irreversibly lost.

IV.F. PUBLIC PARTICIPATION.

A great deal of public concern and participation has been generated throughout the development of the proposed project. The WSSC has conducted or participated in public hearings and numerous informal meetings concerning the proposed action. Public hearings have been held every year on the Prince George's County Ten Year Water and Sewer Plan, of which the proposed action has been a part since 1968 for the effluent pipeline, and 1971 for the 30 mgd AWT additions.

A number of citizens, private organizations, and local, state, regional, and federal agencies have expressed their concern and interest to EPA about the proposed action. On March 7, 1974, EPA conducted a public hearing on the Draft EIS. A summary of the constructive comments made at this hearing is presented in Section VI (the entire public hearing transcript is available for review at this office). All of the written comments received on the Draft EIS are also presented and addressed in Section VI. All of these comments were reviewed, evaluated and considered in the preparation of the Final EIS. The entire EIS procedure is an integral part of this Agency's decision-making process and will be used, in conjunction with all other considerations, to aid the Regional Administrator in making his decision as to this grant application.

EPA wishes to thank all those individuals, groups, and Agencies, which contributed to this process and hopes that, in all cases, proper consideration has been given.

IV.G. PHOTOGRAPHS.

Please refer to Figure 4 for exact location of the photographs.

PHOTO NO. 1 - OPERATIONS BUILDING

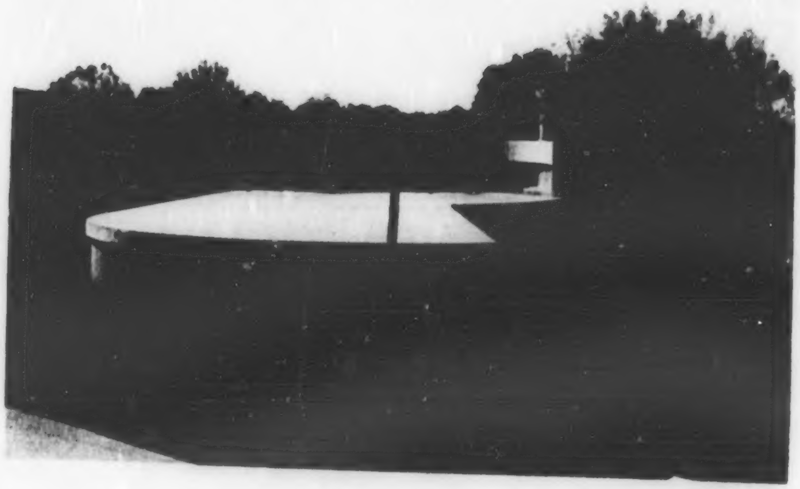

PHOTO NO. 2 - MODEL 5MGD AWT FACILITY

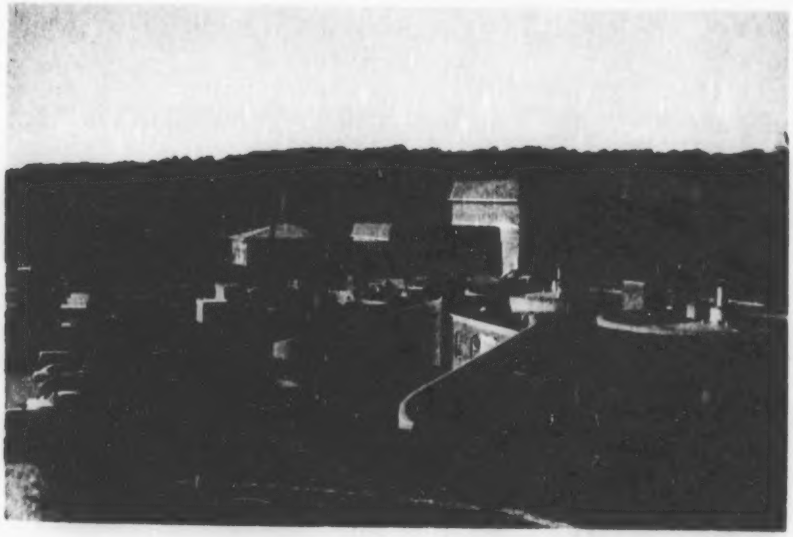

PHOTO NO. 3 - BLENDING TANKS, THICKENER BASINS,
DEWATERING BLDG., AND INCINERATOR BLDG.
FROM FOREGROUND TO BACKGROUND RESPECTIVELY

PHOTO NO. 4 - SITE FOR THE PROPOSED SLUDGE THICKENERS
DEWATERING BLDG., ASH THICKENER, AND
SUPERNATANT TREATMENT TANK

PHOTO NO. 5 - SITE FOR THE PROPOSED MAINTENANCE BLDG. IN BACKGROUND

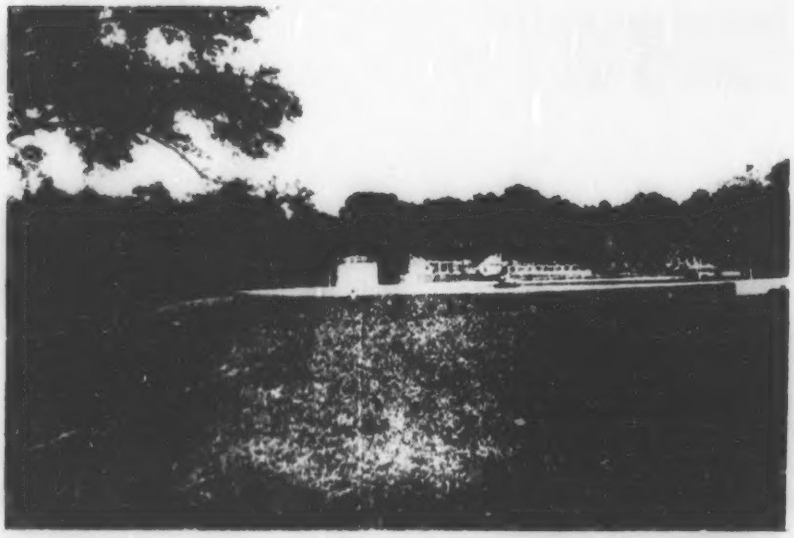

PHOTO NO. 6 - PRIMARY CLARIFIERS AND HEADWORKS

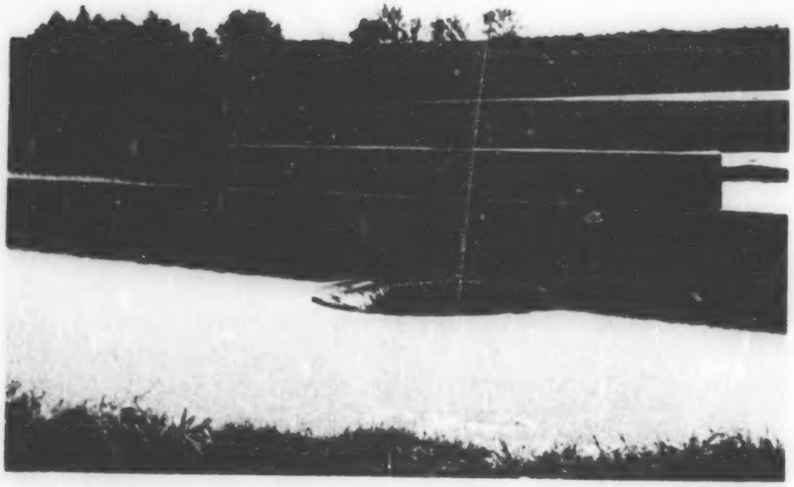

PHOTO NO. 7 - WIER IN THE FOREGROUND AND POLISHING POND IN BACKGROUND

PHOTO NO. 8 - PRESENT EFFLUENT DISCHARGE SITE

PHOTO NO. 9 - LOOKING NORTHWEST INTO PISCATAWAY
BAY FROM PRESENT DISCHARGE SITE

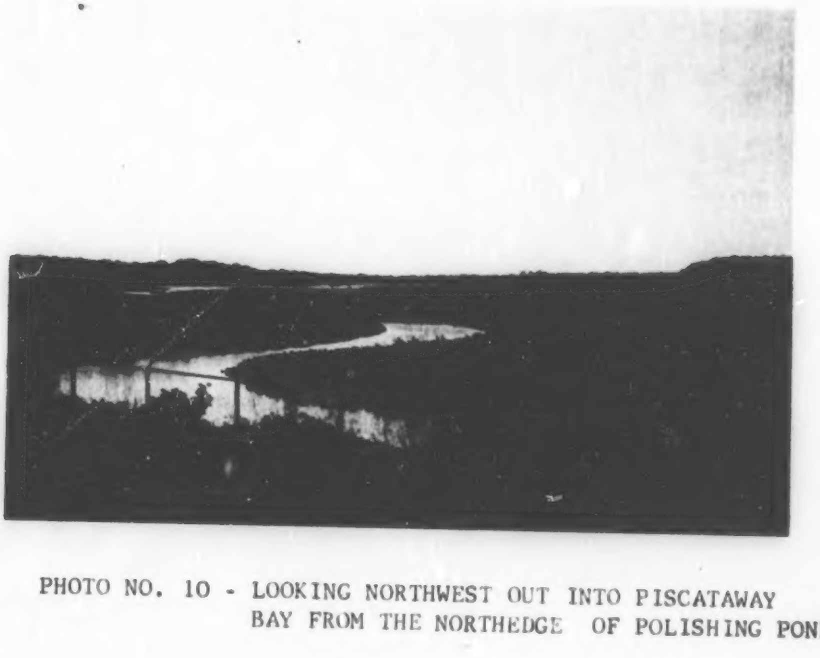

PHOTO NO. 10 - LOOKING NORTHWEST OUT INTO PISCATAWAY
BAY FROM THE NORTHEDGE OF POLISHING POND 1B

PHOTO NO. 11 - INCINERATOR BLDG. FROM THE NORTH SIDE OF POLISHING POND 1B

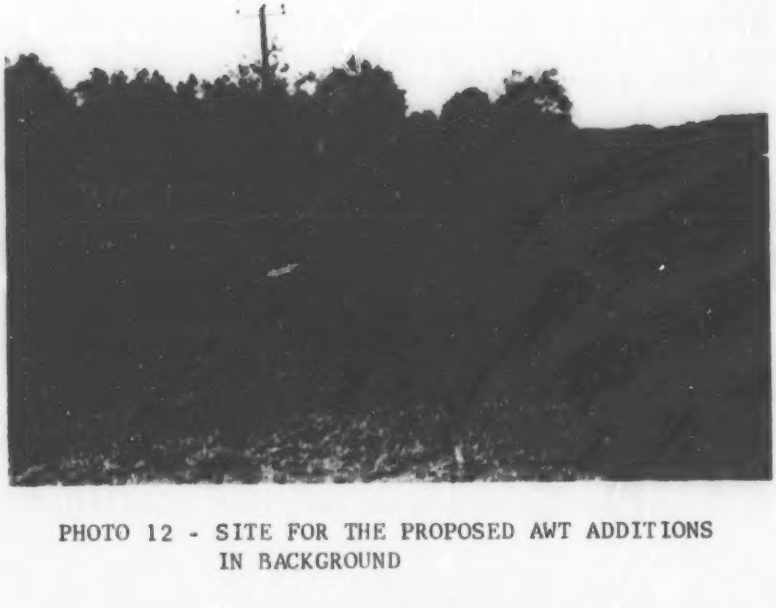

PHOTO 12 - SITE FOR THE PROPOSED AWT ADDITIONS IN BACKGROUND

V. CONCLUSIONS AND RECOMMENDATIONS

Growth in the Washington, D.C. Metropolitan Area during the past several decades has led to degradation of the Potomac Estuary and its tributaries. This trend has markedly increased since World War II. In response, the Federal Government decided that the restoration of the Lower Potomac River Basin, being the dominant natural feature of our Nation's Capital, should be the model for the clean up of our Nation's waterways. Toward this end, the Potomac River Enforcement Conference was established to develop a positive action program to clean up the Lower Potomac and its tributaries. Consequently, in June of 1972, the Enforcement Conference recommended that the Washington Suburban Sanitary Commission design, construct, and put into operation advanced wastewater treatment facilities for the full 30 mgd secondary treatment operation at Piscataway. The current proposal by WSSC to construct such facilities is an integral part of this program and, by itself, would improve water quality in the tributaries to Piscataway Bay, and, to a lesser extent, in Piscataway Bay and the Potomac Estuary. The implementation of the proposed project, in conjunction with the other portions of the wastewater management planning for the Washington D.C. Metropolitan Area, will fulfill the goals of the Enforcement Conference without significantly sacrificing other environmental criteria, and will help provide a cleaner, healthier environment for those who live, work and visit in our Nation's Capital. In addition, the proposal is consistent with EPA policies of consolidating wastewater treatment capacities while utilizing existing facilities where feasible.

It is recognized that this proposal could not be implemented without adverse environmental impacts. The EIS process has shown that these adverse environmental impacts are largely short-term and within acceptable limits, resulting in reasonable trade-offs for the anticipated benefits which would be derived from the proposed action. These minor, short-term, adverse impacts are primarily associated with construction activities and would result in temporary increased noise levels, disruption of traffic, inconveniences to residents, siltation of streams, disruption to wildlife and wildlife habitat, and slight decreases in ambient air quality in areas proximate to construction. However, these impacts would be minimized through sound conservation practices and contemporary construction techniques.

The construction of the proposed 108-inch effluent discharge pipe, while many times larger than that presently required, has been determined to be a sound environmental decision at this time. This is due to the fact that the best planning information available, indicates the Piscataway facility to be expanded in the future and that these plans (County and State) are feasible with regard to water quality objectives. In addition, if a smaller effluent line was initially constructed and an additional effluent line was required later, considerable increased costs would be realized. Finally, and possibly most important, the construction of more than one effluent line would have serious, major, adverse environmental impacts on Piscataway Park, which would be inexcusable due to a lack of foresight. For these reasons, EPA feels it is necessary to fund this portion of the proposal on a long-term basis, while recognizing that at the time further expansion is proposed, another alternative may be pursued; if so, the investment in the excess capacity of the effluent line would not be recuperated. If this situation would occur, it is felt that this investment, of providing insurance that Piscataway Park would not be once again disrupted, would be considered to be a good one.

It should be emphasized, however, that although the proposed effluent line is many times larger than what is presently required, EPA is only endorsing use of that line for 30 mgd, and that this action does not, in any manner, "lock in" or obligate EPA to sponsor or approve contemplated additions to the Piscataway facility as identifed in Section I.F. Each grant application for the construction of wastewater treatment facilities must be reviewed by several governmental agencies to ensure compatability with regional development. In addition, the FWPCA Amendments of 1972 requires a National Pollutant Discharge Elimination System Permit for each increase in effluent levels accompanying future wastewater treatment expansions. Therefore, if and when expansion of the Piscataway facility is proposed, EPA will again conduct an Environmental Review and it will be EPA's policy not to preclude any alternatives due to the existence of the 108-inch effluent line.

The EIS process has also revealed a serious and controversial problem surrounding the proposed method of sludge treatment and disposal (incineration in the new Piscataway incinerators with the residual ash being used as landfill). At the time the Piscataway incinerators were conceived (1970), incineration was thought by many to possibly be the answer for sludge disposal in the Nation. With the advent of the fuel shortage, the possibility of hazardous materials being emitted from the incinerators, and the greater awareness for the need of recycling and reuse of resources, serious investigations and re-evaluations of sludge incineration and other sludge treatment and disposal methods commenced. Some conclusions concerning this problem can be made at this time, while others must wait until thorough testing and evaluations have been completed. One obvious conclusion that can be made at this time is that incineration, as it is proposed for Piscataway, does use significant quantities of a non-renewable resource - mainly, #2 fuel oil. Another obvious conclusion is that stabilization of raw sludge by digestion or composting with land application for use as soil enrichment, conditioner, or fertilizer does provide a "re-use" for sludge and utilizes it as a resource and not as a "waste". Concerning the danger to public health as a result of the operation of the Piscataway incinerators, only some conclusions can be drawn at this time based on preliminary incinerator test results. EPA conclusively feels that the operation of the Piscataway incineraators for testing purposes would not endanger the public health, and that the results of the proposed testing program will confirm these preliminary conclusions. However, EPA will not allow the Piscataway incinerators to operate on a routine basis unless it is assured that the public health would not be endangered. Consequently, the sludge treatment and disposal contingency plan, requested by EPA in the Draft EIS, and developed by WSSC, has been expanded to cover the incinerator testing period and will provide flexibility for sludge handling until final conclusions can be made. At the completion of the incinerator testing program, the test data will be analyzed and evaluated, and a decision will be made as to the method of sludge treatment and disposal which will be pursued at the Piscataway 30 mgd AWT facility. All of this information will be presented in a supplement to this Final EIS. Utilizing this approach concerning the sludge treatment and disposal decision will permit the construction of the AWT additions and the effluent discharge pipe portions of the proposed project to continue without unnecessary delays.

Because this EIS was limited to the proposed upgrading of the existing 30 mgd facility to AWT and the construction of a 108-inch effluent discharge pipe, a number of recommendations were made which surround the possibility of proposals to expand the Piscataway facility. These recommendations are briefly described below with references to their whereabouts in the Final EIS. It is recommended that:

A. WSSC, Prince George's and Montgomery Counties, the State of Maryland, and all other governmental agencies in the D.C. Metropolitan Area with wastewater management responsibilities, give paramount attentions to land treatment in their wastewater treatment management planning. (Section III.D.)

B. In addition to A, land treatment of wastewater and its land area requirements be incorporated into local and regional land use planning, thereby not precluding this method of wastewater treatment in future wastewater management decisions (Section III.D.)

C. Impacts of increased AWT effluent discharge on the Piscataway Park wetlands be thoroughly investigated in conjunction with any plans to increase the quantity of AWT effluent discharge beyond 30 mgd. This should include a complete evaluation of extending the outfall pipe further down the Potomac Estuary in order to avoid or lessen potential impacts on the Park's shoreline. (Section IV.B.1.)

D. To aid in C., the wetlands should be carefully monitored during the operation of the proposed project. (Section IV.B.1.)

E. If monitoring of the Potomac Estuary reveals any significant adverse effects resulting from chlorine residuals in the Piscataway effluent, WSSC should implement additional de-chlorination of the Piscataway effluent. (Section IV.B.1.)

F. A monitoring program for land application of sewage sludge should be developed and implemented for the interim phase of WSSC's contingency plan for sludge treatment and disposal. This monitoring program would be continued if the second phase of WSSC's contingency plan is implemented. (Section IV.B.2.)

G. WSSC be permitted to continue construction of the outfall line during the period from September 1, 1975, through January, 1976, thus allowing the completion of the proposed project by early 1976. (Section A.1.b.(2).

H. The National Capital Parks program their riprapping activities of the Estuary bank, where the proposed outfall line enters the Estuary, to coincide with the construction of the proposed action and WSSC's riprapping of the outfall right-of-way. (Section IV.B.4.)

It will be EPA's policy that, if subsequent to the mandatory 30 day review period of this Final EIS, administrative action is taken on the AWT additions and effluent discharge pipe, the construction grant will be conditioned as to not provide Federal funds for additional sludge treatment and disposal equipment which would not preclude any method for sludge handling until the incinerator testing program has been completed and the test results and evaluations are presented in a Supplement to this Final EIS. In addition, it is recommended that D., E., and F., discussed above, be made conditions to the construction grant.

VI. COMMENTS ON THE DRAFT EIS AND RESPONSES

VI. COMMENTS ON THE DRAFT EIS AND RESPONSES.

A. General.

This Section presents all of the written comments received and a summary of the Public Hearing testimony on the Draft EIS. Responses to each comment follows each letter or testimony. If the comment resulted in a change to the EIS, the response indicates that such a change was made, however, does not reiterate the change.

B. Written Comments.

The written comments and responses are presented in the following order:

FEDERAL AGENCIES

U. S. General Services Administration
U. S. Department of the Treasury
U. S. Atomic Energy Commission
U. S. Department of Agriculture
  Soil Conservation Service
U. S. Department of the Army
  Baltimore District, Corps of Engineers
U. S. Department of Transportation
  U. S. Coast Guard
U. S. Department of Commerce
U. S. Department of Health, Education, and Welfare
U. S. Department of Housing and Urban Development
U. S. Department of Defense
U. S. Department of the Interior

METROPOLITAN CLEARINGHOUSE

Metropolitan Washington Council of Governments

STATE CLEARINGHOUSES (STATE AGENCIES)

Maryland Department of State Planning
Maryland Department of State Planning
Commonwealth of Virginia, Governor's Office
  Council on the Environment
Commonwealth of Virginia, State Air Pollution Control Board
Commonwealth of Virginia, State Water Control Board

LOCAL GOVERNMENTAL AGENCIES

Office of the Montgomery County Executive and County Council
Prince George's County, Md. Department of Public Health
The Maryland - National Capital Park and Planning Commission
National Capital Planning Commission
The Mayor and Town Council of Forest Heights, Maryland

CITIZENRY

Mr. John H. Buckingham, Jr. Manager, Netherwood Creek Wildlife Refuge
The Palisades Citizens Association
Mr. W. L. Callaway
Mr. Stuart G. Hibben
Lung Association of Southern Maryland, Inc.
Mr. David L. Wilt
Mr. James D. Spart, President, Piscataway Hills Citizens Association
Mr. Robert Ruskin, President, Alice Ferguson Foundation, Inc.
Ms. Jean Thompson
Dr. Gordon Wood Anderson
Ms. Nancy W. Ignatius, President, Concern, Inc.
Ms. Sharron S. Quisenberry
Mr. James L. Repace
Ms. Ulla Rudd
Mr. Benjamin R. Swann
Mr. James L. Repace, Chairman, Air Pollution Committee, P. G. Environmental Coalition
National Trust for Historic Preservation
Mr. H. J. Rhodes
Mr. Harold A. Williams, President, Warburton Manor Citizens Association
Mr. and Mrs. Robert Nordstrom

Ms. Edna Henderson
Mr. and Mrs. Ronald E. Kngarise
Mrs. Gerald Fratantuono
Mrs. Sharon Wright
Ms. Erica G. Kenney, President, PTSA Eugene Burroughs Junior High School
Mr. Joseph J. Meder, President, Harmony Hall PTA
Mr. and Mrs. W. R. Buterbaugh
The National Association of Realtors
Mr. Charles G. Dalrymple
Mr. Jim B. Bock
Mr. Charles E. Campbell

FEDERAL AGENCIES

U.S. General Services Administration

U.S. Department of the Treasury

U.S. Atomic Energy Commission

U.S. Department of Agriculture
Soil Conservation Service

U.S. Department of the Army
Baltimore District, Corps of Engineers

U.S. Department of Transportation
U.S. Coast Guard

U.S. Department of Commerce

U.S. Department of Health, Education, and Welfare

U.S. Department of Housing and Urban Development

U.S. Department of Defense

U.S. Department of the Interior

UNITED STATES OF AMERICA
GENERAL SERVICES ADMINISTRATION
WASHINGTON, DC 20405

28 FEB 1974

Mr. Robert J. Blanco, P.E.
Chief, Environmental Impact Branch
Environmental Protection Agency
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

As requested in a February 5 letter from Daniel J. Snyder, III, Regional Administrator, the General Services Administration has reviewed the draft environmental impact statement for the Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 MGD AWT (3-OGC-IS-M-1).

Our review of this draft environmental impact statement discloses no problems of concern to this agency.

Sincerely,

L F Roush

LARRY F. ROUSH
Deputy Administrator for
Special Projects

Keep Freedom in Your Future With U.S. Savings Bonds

OFFICE OF THE SECRETARY OF THE TREASURY
WASHINGTON, D.C. 20220

MAR 18 1974

Dear Mr. Blanco:

This is in response to Mr. Snyder's letter of February 5, 1974, requesting this Department's comments on the draft environmental impact statement for the proposed Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 MGD AWT. The Statement appears to be objectively directed to its stated purpose and the Department has no substantive comments.

For your further information we have been advised by the CEQ that notice of the availability of this Statement for comment was published in their weekly Federal Register listing of February 22. In keeping with Section 1500.11(c) of the CEQ's revised Guidelines, effective after January 28, 1974, the 45-day comment period should be calculated from February 22, rather than the February 5 date of your transmittal letter.

We would appreciate receiving a copy of the final environmental impact statement on this proposal when it is available.

Sincerely yours,

Anthony V. DiSilvestre
Environmental Quality Program Officer

Mr. Robert J. Blanco, P.E.
Chief, Environmental Impact Branch
Region III
Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

MAR 19 1974

Mr. Daniel J. Snyder, III
Regional Administrator
Region III
U. S. Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

We have reviewed the Draft Environmental Impact Statement for the "Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 MGD AWT" which accompanied your letter of February 5, 1974.

As a result of our review, we find that our only concern is the possible effects on the Potomac River Estuary from the Piscataway Facility. The information supplied in the Piscataway Draft Environmental Statement concerning both the qualitative and quantitative impacts on the aquatic biota in the Potomac River is insufficient to permit us to make any positive determinations regarding these effects. ① In particular, the impact of dredging in the estuary during the spawning season (page 125 and 126) and the impact of normal effluents (in particular the discussion concerning chlorine on page F-20) are the ② areas of greatest concern to us. We believe these matters should be addressed in detail in the Final Environmental Statement.

Thank you for the opportunity to comment on this Draft Environmental Statement. If you have any questions regarding our comments, please contact Mr. Hugh Thompson (301-443-6950) of my staff.

Sincerely,

Daniel R. Muller

Daniel R. Muller, Assistant Director
for Environmental Projects
Directorate of Licensing

cc: CEQ (10)

Response: U.S. Atomic Energy Commission

①

The EIS has been revised to clearly indicate that no dredging will occur during the spawning season.

②

The EIS has been revised to include a discussion on the impacts of chlorine residual.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
4321 Hartwick Rd., Rm. 522, College Park, Maryland 20740

March 21, 1974

Mr. Robert J. Blanco, P.E. Chief
Environmental Impact Branch
U. S. Environmental Protection Agency
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

This is in response to your communications with the U. S. Department of Agriculture seeking a review of the Environmental Impact Statement for upgrading and expanding the Piscataway Wastewater Treatment Facility.

Our interest in the proposal is more specifically in the direction of soil erosion and water management.

Our comments are:

1. The discussions pertaining to soil erosion and water management were generally adequate. ①
2. We are pleased to see the use made of the Soil Surveys for Montgomery and Prince George's Counties. ②
3. Section IV, C, pages 137-139 could be strengthened by the inclusion of problems resulting from soil erosion during construction of the buildings, facilities, and effluent pipe line. With preventative and protective measures some impacts occur. ③

We appreciate the opportunity to review this statement and trust our comments are helpful.

Sincerely,

Graham T Munkittrick

GRAHAM T. MUNKITTRICK
State Conservationist

cc: Kenneth E. Grant, Administrator
C.E.Q. (10 copies)

Response: U.S. Department of Agriculture
Soil Conservation Service

①-②

No response necessary.

③

The EIS has been so revised.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MARYLAND 21203

NABPL-E

22 March 1974

Mr. Robert J. Blanco, P.E.
Chief, Environmental Impact Branch
Region III
United States Environmental Protection
Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

A letter dated 5 February 1974 from Mr. Daniel J. Snyder, III, Regional Administrator, requesting review of the Draft Environmental Impact Statement (EIS) for the Piscataway Wastewater Treatment Facility has been referred to this office for comments since the project lies within the Baltimore District boundaries. The Baltimore District, Corps of Engineers has reviewed the Draft EIS for the proposed Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 MGD Advanced Waste Treatment, Prince George's County, Maryland. Our comments are submitted in accordance with provisions of the National Environmental Policy Act of 1969 (Public Law 91-190).

There appears to be nothing in the EIS that indicates that flooding is not a problem in the area. Since elevations are not shown, the Baltimore District cannot review this possible problem. The EIS should either indicate that there is no flood problem or if there is a flooding problem then the Statement should explain how it will be resolved. ①

Copies of this correspondence have been furnished to the Council on Environmental Quality.

Sincerely yours,

WILLIAM E. TRIESCHMAN, Jr.
Chief, Planning Division

Response: U.S. Department of the Army

①

The EIS has been revised to indicate that flooding is not anticipated to be a problem.

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW
WASHINGTON D.C. 20590
PHONE (202) 426-2262

• 22 MAR 1974

•Mr. Daniel J. Snyder, III
Regional Administrator, Region III
U. S. Environmental Protection
Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

This is in response to your letter of 5 February 1974 concerning the draft environmental impact statement for the Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility.

The material submitted has been reviewed by the concerned operating administrations and staff of the Department of Transportation. The Coast Guard had the following comment to offer:

"The statement does not indicate what the effect of turbulence resulting ①
from the effluent discharge will have at the discharge point. A statement of
the possibility of erosion around the effluent discharge point, which may change
the river channel and the actions to be taken to prevent this from happening, ②
should be included in the final statement."

We have no further comments to offer nor do we have any objection to the project. However, the final statement should address the concern of the Coast Guard.

The opportunity to review the draft statement is appreciated.

Sincerely,

R. I. PRICE
Captain, U. S. Coast Guard
Deputy Chief, [illegible]
Environm[illegible]
By direction of [illegible]

Response: U.S. Department of Transportation
U.S. Coast Guard

①

The EIS has been revised to include a discussion of possible turbulence resulting from the effluent discharge. This is not anticipated to result due to the small quantity of effluent (30 mgd average daily flow or 60 mgd peak flow) being discharged by gravity at a depth of approximately 40 feet. However, increased effluent discharges could result in turbulence problems, (although it is not expected) therefore, it will be EPA's policy to thoroughly evaluate this situation in consultation with the Coast Guard at the time increased effluent flows (greater than 30 mgd) are proposed by WSSC.

②

The above response also applies to this comment.

OFFICE OF THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

March 29, 1974

Mr. Robert J. Blanco
Chief, Environmental Impact Branch
Region III
U.S. Environmental Protection Agency
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

The draft environmental impact statement for the proposed upgrading and expansion of the Piscataway Wastewater Treatment Facility to 30 MGD AWT, which accompanied Mr. Snyder's letter of February 5, 1974, has been received by the Department of Commerce for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

Section I, Background

① The draft environmental impact statement indicates on page 22 that the treatment facility may eventually be expanded to accommodate 152 MGD. Since such an expansion is a distinct possibility, at least tentative plans indicating the site of future facilities should be included in the final environmental impact statement. It is likely that subtidal filling of navigable waters would be necessary; such filling represents a major environmental impact.

Section II, Environmental Setting

② Under subheading E., Biology, 3. Fish, on page 55, the draft environmental statement indicates that "fishery resources of the Potentially Serviceable Area have been more seriously affected by degraded water quality." The area in question should be clarified. A substantial commercial fishery exists in many areas of Chesapeake Bay, including its tributaries. The attached catch statistics attest to the Bay's value as a source of edible fish products (Attachment 1).

③ Table D7 should more clearly identify those fish species of commercial or recreational value in Chesapeake Bay waters. To this end, we have provided as Attachment 2 a copy of Table D7, with species of commercial or recreational importance noted by a check mark.

④ This section of the environmental statement should also indicate that portions of the upper Potomac serve as spawning and/or nursery areas for such important sport and commercial species as American shad, blueback herring, alewife, white perch, striped bass, American eel, and Atlantic menhaden.

Section III, Alternatives

⑤ We suggest that the discussion of alternative disinfection methods, page 91, be expanded to include ozonation as a viable technique. The use of ozone as a disinfectant was determined to be an effective means of treating sewage wastes by the American Water Works Association, Inc.1/

Section IV. B, Environmental Impact of the Proposed Action

⑥ Discussion concerning pipeline construction, page 125, should include measures to minimize erosion, such as completing the pipeline in segments (e.g., 1/4-mile lengths) and back filling and seeding with appropriate vegetation following installation of each segment.

⑦ On page 126, the relative detrimental effects to aquatic resources in conjunction with river dredging should be discussed. We recommend that dredging activities be avoided, if possible, during the period April through October to minimize adverse effects on migratory, spawning, and feeding activities of various important sport and commercial species.

Section IV B.2, Impact on Water Quality

⑧

We suggest that this section thoroughly discuss the adverse effects associated with the use of chlorine or chlorine compounds on aquatic life. The literature is replete with evidence of such adverse effects. For example, Brungs[2] recommended that effluents entering fresh waters should not contain chlorine in excess of 0.01 mg/l for the protection of the more resistant organisms, and 0.002 mg/l for the protection of most aquatic species. Jolley[3] determined the presence of more than 50 chlorine-containing constituents in secondary treatment facility effluents, some of which may induce chronic, low-level effects, as documented by C. Tsai[4,5] with respect to species and population changes of fishes below chlorine-treated sewage treatment plant outfalls. Zillich[6] performed continuous-flow bioassays and found that fathead minnows exposed to chlorinated sewage treatment plant effluents exhibited symptoms of stress, including loss of protective slime covering and equilibrium. The liberal use of chlorine at waste treatment facilities was apparently responsible for substantial fish kills in the James River, Virginia, during the summer of 1973 (personal communication, Dr. Robert Huggett, VIMS). Similar kills have occurred at the Cape Cod Canal power plant in Massachusetts and at the Saginaw Bay electrical generating facility in Michigan, due to excessive chlorine in effluent waters[3,7].

The potentially serious impact associated with the increasing use of chlorine as a biocide dictates that this subject receive an in-depth analysis in the final environmental impact statement, inasmuch as modern waste treatment techniques should promote, rather than discourage, the existence of a healthy and viable aquatic environment.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving a copy of the final statement.

Sincerely,

Sidney R Galler

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosures

Literature Cited

(1) The American Water Works Association, Inc. Water Quality and Treatment. Third Edition, McGraw-Hill Book Company, pp. 173-176.

(2) Brungs, William A. 1973. Effects of residual chlorine on aquatic life: Literature Review. Journal Water Pollution Control Federation, 45(10): 2180-2193

(3) Jolley, Robert L. 1973. Chlorination effects on organic constituents in effluents from domestic sanitary sewage treatment plants. Ph.D. dissertation, University of Tennessee.

(4) Tsai, Chu-Fa. 1968. Effects of chlorinated sewage effluents on fishes in Upper Patuxent River, Maryland. Chesapeake Science, 9(2): 83-93.

(5) Tsai, Chu-Fa. 1970. Changes in fish populations and migration in relation to increased sewage pollution in Little Patuxent River, Maryland. Chesapeake Science, 11(1): 34-41.

(6) Zillich, J.A. 1972. Toxicity of combined chlorine residuals to freshwater fish. J. Water Pollution Control Federation, 44: 212-220.

(7) Fairbanks, R. B., W. S. Collings, and W. T. Sides, 1971. An assessment of the effects of electrical power generation on the marine resources in the Cape Cod Canal. Administrative-Technical Advisory Committee Report to the Canal Electric Company, March 13, 1971.

ATTACHMENT 1

SUMMARY OF COMMERCIAL FISHERY HARVEST

AVERAGE ANNUAL 1966 - 1970

CHESAPEAKE BAY AND TRIBUTARIES (EXCEPT SUSQUEHANNA RIVER BASIN)

(IN THOUSANDS)

WATER AREA	ACRES	FINFISH				SHELLFISH 1,2		TOTAL	
		EDIBLE		INDUSTRIAL					
		Lbs.	$	Lbs.	$	Lbs.	$	Lbs.	$
hesapeake Bay	2,041	24,177	1,443	234,976	3,590	54,244	8,166	313,397	13,199
hester River	35	436	54	6	Negl.	2,012	889	2,454	943
hoptank River	69	880	118	7	Negl.	4,800	1,730	5,687	1,848
nticoke River	18	506	67	24	1	537	236	1,067	304
tuxent River	30	260	39	5	Negl.	896	500	1,161	539
icomico River	10	96	11	9	Negl.	143	93	248	104
otomac River	310	11,006	590	3,974	73	10,543	4,673	25,523	5,336
ppahannock River	98	4,898	219	1,993	35	7,498	2,005	14,389	2,259
rk River	55	2,513	113	1,577	30	3,856	572	7,946	715
es River	166	4,695	264	1,125	20	3,834	4,398	9,654	4,682
aside	214	745	56	10	Negl.	6,222	2,653	6,977	2,709
Total Study Area	3,046	50,212	2,974	243,706	3,749	94,585	25,915	388,503	32,638

Seed oysters included in value, but not in weight.
Bivalve mollusks reported as pounds of meat.

137

COMMERCIAL SHELLFISH HARVEST

AVERAGE ANNUAL 1966 - 1970

Chesapeake Bay and Tributaries (Except Susquehanna River Basin) (2

ER AREA	ACRES	CRABS Lbs.	CRABS $	CLAMS Lbs.[2]	CLAMS $	OYSTERS[1] Lbs.[2]	OYSTERS[1] $	MISC. Lbs.	MISC. $	TOTAL Lbs.	TOTAL $
eake Bay	2,041	45,081	3,65	3,806	1,341	5,097	3,144	260	29	54,244	8,166
r River	35	306	2	707	268	985	590	14	2	2,012	839
nk River	69	2,276	21	219	69	2,281	1,445	24	4	4,800	1,730
oke River	18	179	1	-	-	347	219	11	2	537	236
nt River	30	65		85	23	746	470	-	-	896	500
co River	10	-	-	-	-	143	93	-	-	143	93
e River	310	3,385	31	971	277	6,186	4,079	1	Negl.	10,543	4,673
annock River	98	5,052	39	49	11	2,378	1,600	19	4	7,493	2,005
iver	55	3,334	22	136	83	386	261	-	-	3,856	572
River	166	2,140	15	45	28	1,595	4,203	54	11	3,834	4,393
e	214	3,495	30	1,597	923	1,126	1,421	4	2	6,222	2,653
l Study Area	3,046	65,313	5,31	7,615	3,023	21,270	17,525	387	54	94,585	25,915

ed oysters included in value but not weight.
ported as pounds of meat.

7

Reproduced from best available copy.

[illegible] 19[illegible] - 1970

CHESAPEAKE BAY AND TRIBUTARIES (EXCEPT SUSQUEHANNA RIVER BASIN)

(IN THOUSANDS)

ALEWIVES Lbs.	$	CATFISH Lbs.	$	CROAKER Lbs.	$	MENHADEN Lbs.	$	SHAD Lbs.	$	SPOT Lbs.	$	STRIPED BASS Lbs.	$	OTHERS Lbs.	$	TOTAL FINFISH Lbs.	$
,747	247	14	2	308	43	233,735	3,574	1,249	116	1,556	160	2,300	430	,243	461	259,153	5,0
39	1	15	1	-	-	6	Negl.	31	3	-	-	112	21	239	28	442	5
112	2	26	3	-	-	7	Negl.	55	6	2	Negl.	392	74	293	33	887	11
72	1	18	2	-	-	24	1	62	7	-	-	237	44	117	13	530	[illegible]
10	Negl.	7	1	-	-	5	Negl.	6	Negl.	14	2	125	25	98	11	265	3
25	Negl.	3	Negl.	-	-	9	Negl.	13	1	-	-	40	8	15	2	105	1
5[illegible]5	132	195	22	4	1	[illegible]	72	333	32	500	56	1,228	219	,202	129	14,990	66
49	61	195	27	11	1	[illegible]	33	492	38	168	15	217	42	653	37	6,891	29
52	32	26	3	14	2	1,511	29	258	19	167	14	137	25	295	19	4,090	14
53	51	391	54	22	3	[illegible]	17	556	41	244	21	293	55	712	42	5,820	2
	-	-	-	3	Negl.	1	Negl.	11	1	122	16	53	11	565	28	755	5
4	527	890	115	362	50	242,117	3,726	3,066	264	2,773	284	5,134	954	11,432	803	293,918	6,7

COMMERCIAL FINFISH HARVEST

AVERAGE ANNUAL 1966 - 1970

CHESAPEAKE BAY AND TRIBUTARIES (EXCEPT SUSQUEHANNA RIVER BASIN)

(IN THOUSANDS)

TER AREA	ACRES	ALEWIVES Lbs.	ALEWIVES $	CATFISH Lbs.	CATFISH $	CROAKER Lbs.	CROAKER $	MENHADEN Lbs.	MENHADEN $	SHAD Lbs.	SHAD $	SPOT Lbs.	SPOT $	STRIPED BASS Lbs.	STRIPED BASS $
pecke Bay	2,041	12,747	247	14	2	308	43	233,736	3,574	1,249	116	1,556	160	2,300	430
er River	35	39	1	15	1	-	-	6	Negl.	31	3	-	-	112	21
ank River	69	112	2	26	3	-	-	7	Negl.	55	6	2	Negl.	392	74
coko River	18	72	1	18	2	-	-	24	1	62	7	-	-	237	44
ent River	30	10	Negl.	7	1	-	-	5	Negl.	6	Negl.	14	2	125	25
ico River	10	25	Negl.	3	Neg.	-	-	9	Negl.	13	1	-	-	40	8
ac River	310	7,585	132	195	22	4	1	3,933	72	333	32	500	55	1,228	219
nannock River	98	3,249	61	195	27	11	1	1,905	33	492	38	168	15	217	42
River	55	1,652	32	26	3	14	2	1,541	29	258	19	167	14	137	25
River	166	2,653	51	391	54	22	3	949	17	556	41	244	21	293	55
de	214	-	-	-	-	3	Negl.	1	Negl.	11	1	122	16	53	11
al Study Area	3,046	28,144	527	890	115	362	50	242,117	3,726	3,066	264	2,773	284	5,134	954

ATTACHMENT 2

WAPORA

Table D7

IMPORTANT FISHES OF THE LOWER POTOMAC ESTUARY WHICH ENTER BRACKISH WATER*

	Common Name	Scientific Name
	Sea lamprey	*Petromyzon marinus*
	Stingaree	*Dasyatis sabina*
	Lownose ray	*Rhinoptera quadriloba*
X	Atlantic sturgeon	*Acipenser oxyrhynchus*
	Shortnose sturgeon	*Acipenser brevirostrum*
	Southern longnose gar	*Lepisosteus osseus*
X	Hickory shad	*Pomolobus mediocris*
X	Blueback herring	*Alosa aestivalis*
X	Alewife herring	*Alosa pseudoharengus*
X	American shad	*Alosa sapidissima*
X	Menhaden	*Brevoortia tyrannus*
	Gizzard shad	*Dorosoma cepedianum*
X	Chain pickerel	*Esox niger*
X	Redfin pickerel	*Esox americanus*
	Easterns redhorse	*Moxostoma macrolepidotum*
	Creek chubsucker	*Erimyzon oblongus*
X	Carp	*Cyprinus carpio*
	Goldfish	*Carassius auratus*
	Golden shiner	*Notemigonus crysoleucus*
	Spottail shiner	*Notropis hudsonius*
	Silvery minnow	*Hybognathus nuchalis*
X	Blue catfish	*Ictalurus furcatus*
X	Channel catfish	*Ictalurus punctatus*
X	White catfish	*Ictalurus catus*
X	Striped bass	*Roccus saxatilis* (SC)(A)
X	Largemouth bass	*Micropterus salmoides*
X	Pumpkinseed	*Lepomis gibbosus*
X	Red belly sunfish	*Lepomis auritus*
X	White crappie	*Pomoxis annularis*
X	Yellow perch	*Perca flavescens* (SC)(A)
X	Bluefish	*Pomatomus saltatrix* (SC)(A)
X	Cabio	*Rachycentron canadum*
X	Amberjack	*Seriola dumerili*
X	Pigfish	*Orthopristis chrysopterus*
X	Spot	*Leiostomus xanthurus*
X	Silver perch	*Bairdiella chrysura*
X	Red drum	*Sciaenops ocellata*
X	Atlantic croaker	*Micropogon undulatus* (SC)(A)
X	Black drum	*Pogonias cromis*
X	Northern King whiting	*Menticirrhus saxatilis*
X	Spotted seatrout	*Cynoscion nebulosus*
	Weakfish	[illegible]
X	Sheepshead	*Archosargus probatocephalus*
X	Spadefish	*Chaetodipterus faber*

TABLE 7 (cont'd)

X	Spanish mackerel	*Scomberomorus maculatus*
X	Harvestfish	*Peprilus paru*
X	Summer flounder	*Paralichthys dentatus* (SC)(A)
X	Winter flounder	*Pseudopleuronectes americanus*
	Hogchoker	*Trinectes maculatus*
	Toadfish	*Opsanus tau*
X	Brown bullhead	*Amerirus nalales*
X	American eel	*Anguilla rostrata* (SC)(A)
	Needlefish	*Strongylura marina*
X	White perch	*Morone americana* (SC)(A)

3

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* Adapted from Mansueti, 1950 and Mansueti, unpublished.
A= Abundant
SC=Sports or Commercial fishes

Response: U.S. Department of Commerce

①

The scope of the EIS is limited to the upgrading and expansion of the Piscataway Facility to 30 mgd AWT. The EIS has been revised to emphasize that any further expansion of this facility will again be subject to the NEPA process, at which time resultant impacts of such expansion will be examined.

②-⑦

The EIS has been revised to reflect these concerns.

⑧

The EIS has been revised to include some discussion concerning the impacts of chlorine residual on the aquatic biota. However, as was indicated in the Final EIS, it is felt that due to the small quantity of effluent in comparison to the large quantity of estuary water, chlorine concentration, mixing and tidal actions, no significant adverse effects on the aquatic biota will occur. However, monitoring is recommended and more detailed investigations will be required if and when expansion of the Piscataway facility is proposed.

Memorandum

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY
REGION III - PHILADELPHIA

TO : Mr. Robert J. Blanco, P.E.
Chief, Environmental Impact Branch

DATE: April 3, 1974

FROM : Gorham L. Black, Jr.
Regional Director

SUBJECT: Piscataway Wastewater Treatment Facility
SW Prince George's County, Maryland

General Comments:

Environment

Some damage to the environment would occur. About 30 trees exceeding 40 feet would be removed. Some small wildlife would be displaced. However, it does not appear that the short or long term environmental effects will be significant. ①

Sludge is to be incinerated. However, applicant is presently giving serious consideration to alternative methods of sludge treatment and should be encouraged to do so as their annual requirement of fuel oil, using the incinerator method, would be 1,051,200 gallons. This is equivalent to heating 701 homes in the same period according to the Maryland Oil Heat Association. Further exploration of alternative methods is recommended. ②

Human Values

In the next 30 to 50 years the area will be developed as a limited park recreational facility. It is located near several national sites of interest:

Mt. Vernon - 2 1/2 miles downstream ③
Fort Washington - 1 mile upstream
Near National Colonial Farm (mid 18th century)
Archaeological sites (pre-history of Middle Atlantic area)

All aesthetic considerations will be restored under the supervision of the National Park Service.

The report is a very comprehensive survey, and the damage caused by this installation is minimal whereas the gain is maximal and long range. ④

MEMORANDUM

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY

TO : Mr. Joe Yarbrough
Regional Environmental Officer, Region III
P. O. Box 13716
Philadelphia, Pennsylvania 19101

DATE: FEB 22 1974

FROM : Charles Custard
Director OEA

SUBJECT: Draft Environmental Impact Statement - EPA: Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 MGD AWT (3-OBC-IS-M-1)

Attached find a copy of the above-captioned draft Environmental Impact Statement for your review and comment. Please forward your comments directly to Mr. Robert J. Blanco by March 29, 1974, with one copy of your comments and the control slip to this Office (Office of Environmental Affairs, Room 4740, Attention: Phyllis Hayes), and two copies of your comments to Warren Muir, Council on Environmental Quality, 722 Jackson Place, N.W., Washington, D.C. 20006.

If you have any questions, please call Ms. Hayes at (202) 245-7243.

Thank you.

Attachment

Reproduced from best available copy.

cc: Mr. Robert J. Blanco, P. E.
Chief, Environmental Impact Branch
Environmental Protection Agency
Region III
6th & Walnut Streets
Philadelphia, Penna. 19106

Response: U.S. Department of Health, Education
and Welfare

①

No response necessary.

②

Alternatives for sludge treatment and disposal are discussed and evaluated along with a contingency plan developed by WSSC.

③

The EIS reflects these comments.

④

No response necessary.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D.C. AREA OFFICE
1875 CONNECTICUT AVENUE, N.W., UNIVERSAL NORTH BUILDING
WASHINGTON, D.C. 20009

REGION III
Curtis Building
6th. and Walnut Streets
Philadelphia, Pennsylvania 19106

April 5, 1974

IN REPLY REFER TO:
3.2PP

Mr. Daniel J. Synder, III
Regional Administrator
Attention: Mr. Robert Blanco
Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Synder:

Subject: Preliminary Draft Environmental Impact Statement/Upgrading and Expansion of WSSC Piscateway Wastewater Treatment Facility to 30 MGD AWT (3-OGC-15-M-1) Prince Georges County, Maryland

The Washington D.C. HUD Area Office has reviewed the above subject EIS.

It appears that the statement provides an adequate assessment of adverse environmental impacts, most of which appear short-term. There is unfortunately little discussion, as the statement notes, "on the important issue of how the sewer moratorium and the controlled growth policies affect the distribution of housing among the socio-economic groups in the study area". The final EIS might include additional discussion here, especially in terms of beneficial environmental impacts on sound urban growth if the wastewater treatment facility is completed. ①

If you have any further questions, please contact this office.

Sincerely,

Harry W Staller

Harry W. Staller,
Acting Area Director

Response: U.S. Department of Housing and Urban Development

①

The EIS has been so revised.

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

HEALTH AND
ENVIRONMENT

8 APR 1974

Mr. Daniel J. Snyder, III
Regional Administrator
Region III
Environmental Protection Agency
6th and Walnut Streets
Curtis Building
Philadelphia, Pa. 19106

Dear Mr. Snyder:

The EPA Draft Environmental Impact Statement on Upgrading the Existing WSSC Piscataway Wastewater Treatment Facility has been reviewed by the Military Departments of DoD. The enclosed comments are provided for your consideration.

H.R. Smith

H. R. Smith
Acting Deputy Asst Secretary of Defense
(Environmental Quality)

Enclosure
a/s

DRAFT EIS
PISCATAWAY AWT
DoD COMMENTS

1. Mailing List (Pg XIII): Address should be: ①

Colonel Herbert E. Bell
Headquarters USAF (PREV)
Washington, D.C. 20330

Add: Dr. Billy E. Welch
SAF/ILE
Washington, D.C. 20330

2. Page 41, Table 10: Change Plant #2 to Plant #4. Based on most recent information available, table should be revised as follows: ②

PARAGRAPH	LOADING RATE (lbs/day)		TOTAL
	Plant #1	Plant #4	
Phosphorus (P)	53.0	3.0	56.0
NO_3-N	30.0	0.2	30.2
BOD	167.0	12.0	189.0
Flow (MGD)	1.0	0.05	1.05

3. Page 41, Line 3: Indicate that Andrews has two secondary sewage treatment facilities discharging to the Piscataway Basin. ③

4. Page 41, Lines 9 and 10: Percent of load should be changed to read flow - 1.8%; phosphorus - 48.2%; nitrate-nitrogen - 11.7%; BOD - 10.9%. ④

5. Page 71, Last sentence in footnote: Recommend that this sentence be deleted. The Memorandum of Understanding between the Department of Defense and Prince Georges County (copy enclosed) indicates that not more than 1350 military housing units will be built at Andrews Air Force Base over and above the 1016 units existing on January 1, 1974. ⑤

6. Page 127, Line 7: Statements made relative to Andrews AFB can be misconstrued to indicate that no treatment is furnished. This section should be rewritten to indicate that the existing AAFB waste treatment plants produce an effluent quality in compliance with current State standards. The dilution ratio of Tinker's Creek of mean annual flow ⑥

is too low to properly assimilate the treatment waste. The total stream flow in the upper drainage basin is practically composed of treated waste effluent which results in the upper concentration levels shown in the report. These loads when discussed separately from the overall problem are disproportionate.

7. Page 127, Line 11: The context of this sentence implies that removal of the Andrews AFB Plant effluents from Tinker's Creek will significantly reduce nutrient loadings to the Piscataway Bay. Comparison of the loadings shown in Tables 9, 10, 11, and 12, pp 40-43 indicates that, at maximum, Andrews will contribute only about 2 to 3 percent of the total bay loading. It is suggested that this section be rewritten to reflect the percentages of pollutants and concentrations contributed by each source, including the Potomac mainstem, to the total bay loading. ⑦

8. Pages 135-136: The Military Housing Issue: This section should be revised to reflect the Memorandum of Understanding between Prince Georges' County and DoD reflecting the amicable relationship now existing between Andrews and the County and the limitations established on new Military Family Housing within the County. Copies of the Memorandum of Understanding and the DoD National Capitol Region Family Housing Plan should be included as appendices to this statement. It should be noted that at present, it is proposed that 36 percent (1350 units) of the additional regional housing will be located at Andrews AFB rather than 45 percent as indicated in the environmental statement. ⑧

9. Appendix I, Table I-3, Federal Installations: ⑨

   a. Change "Andrews AFB Housing" to "Brandywine Family Housing Site."

   b. Andrews AFB, Plant #3:

      (1) Change design flow to 0.48MGD

      (2) Change status to indicate planned connection to WSSC sewage treatment facility on Western Branch of Patuxent River as indicated in paragraph 4 of above mentioned Memorandum of Understanding.

   c. Andrews AFB, Plant #4: Change Actual flow to 0.04MGD.

10. Appendix I, Table 3: The designation "Naval Proving Grounds" should be changed to "Naval Ordnance Stations" and a fourth sewage plant added with a design capacity of 0.020MGD, actual flow of 0.10MGD, secondary treatment and discharge to Mattawoman Creek. ⑩

Also, Plants No. 1 and 3 of the Naval Ordnance Station discharge to the Potomac River, not Mattawoman Creek. ⑪

11. Appendix I, Table 3: The receiving stream for the Naval Ordnance Plant, White Oak should be designated as "Paint Branch." ⑫

Response: U.S. Department of Defense

①-⑤

Correction and revisions have been made.

⑥

The EIS has been corrected to indicate that Andrews AFB is providing secondary treatment. There are no "State effluent standards". Tinker's Creek and Piscataway Creek have been classified water quality limiting for nutrients; that is, nutrients must be controlled in order to achieve water quality standards. Since the treatment plants at Andrews do not provide nutrient removal and do contribute a significant portion of the pollutant loadings to Tinker's Creek, and since Tinker's Creek provides poor dilution and assimilation of pollutants, it is obvious that violations of state water quality standards will and do occur as a result of the discharge of secondary treated sewage from Andrews AFB. If the treatment plants at Andrews were producing an effluent which did not result in a violation of water quality standards, there would be no need for connection to the Piscataway AWT plant.

⑦

The sentence in question states that diversion of Andrews AFB treated wastewater flows "----- would significantly improve water quality in Tinker's and reduce loadings to the Bay." It is felt that this sentence is technically correct and does not imply that a "significant" reduction of nutrient loadings will be realized in Piscataway Bay. Existing pollutant loadings and their impact on water quality have been adequately discussed in Section II.D.2, Water Quality. To repeat these conditions would be redundant and serve no practical purpose.

⑧

The section on the Military Housing Issue has been revised and the Memorandum of Understanding has been included in Appendix K. However, it is felt that inclusion of the DOD National Capital Region Family Plan in the EIS is not warrantied.

⑨-⑫

Corrections indicated have been made.

United States Department of the Interior
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-74/205

APR 15 1974

Dear Mr. Snyder:

This Department has received and reviewed the draft environmental statement for the Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 MGD AWT, Prince George's County, Maryland.

The statement does not adequately deal with the discharge of chlorine ①
(chloramine) and its cumulative impact on the fishes of the Potomac
River Estuary and Chesapeake Bay. Recent research has revealed the
build-up of chlorine is significantly impacting shellfish spawning
and may similarly be affecting fin fish. Ozonation is an alternative
solution and should be, but has not been, addressed in the statement.

Discussion of future plant expansion is provided in the statement with
reference to the discharge line and the effluent; however, no discus- ②
sion is provided relating to future expansion of the plant facility
itself. Figure 4 on page 8, which is a site plan of the existing and
proposed wastewater treatment facilities at the Piscataway plant, in-
dicates that a significant amount of the lands at the site presently
owned by the Washington Suburban Sanitary Commission will be occupied
with the facilities for advanced wastewater treatment of 30 million
gallons per day (mgd). The statement does not address itself to how
much additional land may be required to accomplish the future expan-
sion to 95 mgd. Also noted on this figure are two historic sites on
the shoreline of Piscataway Creek which are not described in the
text. In addition, we suggest consideration be given to protection
of the shoreline through this area to accommodate the future right- ③
of-way of the proposed Potomac Heritage Trail. If future plant ex-
pansion would involve filling in Piscataway Bay, the attendant impacts
should be discussed in the statement, and it should be mentioned that
a Department of the Army permit would be required. As the upland is
not heavily developed at present, we suggest that the ultimate land
needs should be acquired at an early date to avoid filling estuarine
areas.

Mr. Daniel J. Snyder, III, Philadelphia, Pennsylvania

④ We are concerned about the methods of shoreline protection at the point of entry of the pipeline into the river bay. This particular section of the Mockley Point area is eroding rapidly and will require extensive bank treatment to prevent further erosion. The concern is one of aesthetics in that the entire shoreline along this area should be treated in a similar fashion to ensure that the view from Mount Vernon is not blighted by an obvious scar at the point of entry of the pipeline.

⑤ There is no discussion of potential river bottom erosion from the discharge at the end of the line. Dye studies have indicated that the tidal action could carry suspended solids into the mouth of Piscataway Bay. The potential for sediment deposits within Piscataway Bay exists if an extensive amount of bottom erosion occurs. ⑥ Further, if there is a constant release of heavy metals in the liquid effluent, there is the possibility for the local sediment on the Potomac bottom to bind the metals or for the metals to accumulate, as released metals adsorb to suspended sediment particles which eventually settle in the area.

⑦ We note that it is possible that the project may adversely affect the deeds of scenic easements granted to the United States by landowners located adjacent to Piscataway Park. These easements were obtained to protect the scenic overlook from Mount Vernon. Were the project deemed to violate and thereby terminate these easements, alternative arrangements would be required to be made to condemn similar easements to protect the integrity of the Mount Vernon overlook. Specifically, it would appear that WSSC would be required, as a condition of using parklands for the sewerline, to indemnify the United States and to re-acquire all affected scenic easements, if any.

⑧ Although the draft environmental statement includes both geologic and soils maps of an area encompassing several counties, together with tables giving the engineering properties of the rocks and soils, the location of the treatment plant is not specific enough to determine in which map unit it lies. The problem is compounded on the geologic map by the omission of a map unit pattern at or near the plant. Discussion in the text does not help as it is in terms of counties as a whole. These matters should be clarified in the final environmental statement so that the geologic and soil conditions at the plant and along the route of the outfall pipe can be evaluated.

Page 7 indicates that a surveillance program is being conducted in Piscataway Bay. Over the past several months, the National Park Service has been conducting a research effort in the vicinity in connection with its environmental program on the Lightship Chesapeake. We are enclosing a copy of an interim report from this study, which may be of value to you. It is hoped that this ongoing study will provide a base of information for better understanding of the changes which may occur if the proposal is implemented.

⑨ Figure 6 on page 14 clearly shows the proximity of Mount Vernon to the proposed alignment of the 108-inch pipeline. Page 137 says that no construction will occur during 1976 because of the importance of the Bicentennial celebration. The statement should also point out that the primary purpose of Piscataway Park is to protect the view from Mount Vernon and to maintain that view as it was during the era when George Washington occupied Mount Vernon.

⑩ The high-flow data in Table 7 (p. 37) do not include the data for the flood of June 1972. If these data are included, the high flows would be more than double the values shown in Table 7.

⑪ With reference to page 46, if the water to deliver sewage to the Piscataway treatment plant is dependent on upstream reservoirs, the impacts of this water use should be discussed in the statement. These reservoirs are not guaranteed for construction; thus, alternative water sources and their environmental impacts need to be discussed in more detail.

⑫ On page 94, under "Effluent Disposal," various items are discussed; however, environmental impacts are not fully covered. The mean value of the effluent of 5 mg/l is no indication of a good oxygen condition. Aquatic resources could survive or die depending on the range of a mean. High oxygen conditions and lows of zero can provide a mean value of 5 mg/l. However, extended zero conditions are lethal for most aquatic resources.

We agree that phytoplankters produce oxygen during the day. However, if dissolved oxygen samples are taken at night and on the bottom, a lack of oxygen becomes apparent.

⑬ Increasing the level of treatment to include nutrient removal will not affect the dissolved oxygen levels in the Potomac River Estuary (p. 95). Watershed nutrients far exceed those needed to support phytoplankton populations. This is the reason eutrophication is occurring throughout the area. The biological analyses on this page are incorrect and should be corrected to clarify this.

Mr. Daniel J. Snyder, III, Philadelphia, Pennsylvania

⑭ A brief discussion of the project dredging is provided on page 96; however the impacts on resources within the dredge and spoil areas are not provided in the alternatives.

⑮ We do not agree with the statement on page 98 (lines 2 and 3) that "the high water table" can be used as a valid reason for rejecting deep well disposal.

⑯ Page 108 indicates that the proposed 108-inch pipeline could carry a peak load of 325 mgd or 162 mgd in an average flow. Page 20, on the other hand, indicates that the maximum anticipated flow would be 95-125 mgd. We are, of course, interested in the minimum disruption of the park's resources and therefore encourage a one-time installation of this line but we feel that selection of the 108-inch-diameter line should be more fully discussed.

⑰ Footnote 2 (p. 110) is inaccurate and we suggest that it be deleted. The Park Service currently has a scenic easement over the private property in question, and present plans do not contemplate fee acquisition of these lands.

⑱ Page 111 indicates that, during construction, the project control inspector will notify qualified archeologists if artifacts are discovered during excavation. The statement should indicate that the Park Service will require a qualified archeologist to be on the site during the entire excavation process.

⑲ Page 112 refers to Dyke Marsh as the disposal area of 4,000 cubic yards of dredged material. As pointed out in a letter of November 26, 1973, from WSSC to Mr. Walter A. Klein (Appendix K10), the National Park Service is currently developing standards for the filling of Dyke Marsh and will most likely require the erection of dikes around the areas to be filled. Unless these dikes are constructed, we cannot guarantee that this disposal site will be available. Thus, we encourage WSSC to seek alternative disposal methods. If the dredge material is to be disposed of in Dyke Marsh, we will require sufficient chemical and biological analysis to ensure that it meets the quality which will be prescribed for the restoration project. The impact of this proposed disposal is not provided, including the impact on fish spawning in the disposal area. The statement should mention the fact that no disposal can be approved for placement in the Dyke Marsh area until a mutually acceptable restoration plan is provided by the National Capital Park Service to the Department of the Interior, Assistant Secretary for Fish and Wildlife and Parks.

Pages 113-114 discuss the permit requirements. Although monitoring is discussed, there is currently no provision in the statement for an overload of the system which could result in the discharge of untreated sewage into the Potomac River. The most stringent methods of monitoring the effluent, along with fail-safe procedures to prevent the discharge of untreated or poorly treated sewage into the river in the event of an overload or breakdown of the system, should be addressed. ⑳

Although references are made to the dye studies which were conducted by WAPORA, Inc., they are not included in this draft statement. The dye studies indicate that from the proposed point of discharge, the tidal influence will carry much of the effluent upstream, around Mockley Point, and into the mouth of Piscataway Bay. The potential for damage to the shoreline of the park resulting from possible overloads of the system could be severe. Consideration should be given in the statement to the alternatives of extending the discharge point down the river to avoid this possibility, and of further dye studies to determine what point would pose less of a threat to the Piscataway embayment. By suggesting this alternative, it is not meant to imply that the National Park Service would consider extending the pipeline further through the park to reach that discharge point. Rather, we would propose that such extension be laid in the bed of the river if it were found to be needed at all. ㉑

It is indicated (p. 126) that the impact of the proposed dredging could be reduced by dredging during certain periods of the year to avoid turbidity during the major fish spawning season. This should be offered more positively in the final statement. The intent of the National Environmental Policy Act is designed to explore alternatives to reduce the environmental impact of a proposed action. This is a positive alternative which can easily be implemented. ㉒

It is further indicated that because the fish species in the area spawn at night, dredging only in daylight hours, during the spawning season, would reduce the impact. However, the turbidity that is generated during daylight dredging can easily cover and kill the fish eggs that were deposited the previous night. The species involved should be further discussed. Are there any species which spawn during the day? ㉓

On page 112, incineration of the sludge is discussed as the best method within current technological restraints. We would hope that, at the time the plant is considered for expansion beyond 30 mgd, a thorough re-evaluation of incineration is made in hope that technology will have developed an alternative which will allow a viable method for recycling this material. In the last paragraph on page 132, the statement that "these caveats may preclude alternative means of sludge disposal" appears to be in error. Perhaps the intention was "necessitate," rather than "preclude." ㉔

With respect to page 140, Section IV.D., we suggest that this section would be more complete if the ultimate site needs were provided. ㉕

Piscataway Park is on the National Register of Historic Places. It is therefore necessary to comply with "Procedures for the Protection of Historic and Cultural Properties," published in the Federal Register of January 25, 1974. These procedures require officials of the agencies involved in an undertaking to consult with the State Historic Preservation Office and the Advisory Council on Historic Preservation and to enter into an agreement concerning measures to mitigate the adverse effects of such an undertaking. ㉖

We thank you for the opportunity to review and comment on this environmental impact statement and hope that our comments will assist in the preparation of the final statement.

Sincerely yours,

Royston C. Hughes

Secretary of the Interior

Mr. Daniel J. Snyder, III
Regional Administrator
Region III
Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Enclosure

Response: U.S. Department of the Interior

①

The EIS has been so revised.

②

The EIS is limited to the proposed action of upgrading the existing 30 mgd facility to AWT and constructing an effluent discharge pipe. EPA is not considering the use of the facility or the discharge pipe for more than 30 mgd at this time.

③

The two historical sites on the shoreline of Piscataway Creek are described in an attachment to the letter from the Maryland Historical Trust. The proposed Piscataway facilities will not affect the future possibility of the Potomac Heritage Trail. This will be addressed with additional EIS's, if necessary.

④

National Capital Parks has, on a long term basis, programmed for the riprapping of this section of bank; however, funding limitations and other priorities do not permit this work to be done in the near future. The EIS has been revised to reflect these concerns.

⑤

The EIS has been revised to reflect these concerns.

⑥

This is not anticipated to be a problem.

⑦

The National Park Service does not feel that significant risk exists for the loss of land or land interests in Piscataway Park as a result of the crossing of this sewer line since this is a subsurface use from which only temporary surface disturbance will result. It is possible, however, that the owners of lands in the area could claim that this use was a violation of their conveyance to the National Park Service, and could seek reversion of their lands or land interests as a result. If this were pursued through the courts with a ruling favoring these owners, the result could be the loss to the National Park Service of several million dollars worth of lands and land interests. If so, the Washington Suburban Sanitary Commission should be required to replace this loss and also reimburse the National Park Service for any related expenses incurred.

⑧

The EIS has been revised to include this information in brief.

⑨

The EIS has been so corrected.

⑩

The EIS has been revised to include more up-to-date data.

⑪

This problem is not associated with the proposed upgrading to 30 mgd AWT.

⑫

No extended zero oxygen conditions are anticipated as a result of the proposed action. The proposed facilities include reaeration units which will increase D.O. concentrations.

⑬

The EIS has been corrected.

⑭

These concerns are discussed in Section IV.

⑮

The EIS has been so corrected.

⑯

The EIS has been so revised.

⑰

The EIS has been so corrected.

⑱

The National Park Service will require a qualified archeologist to be retained by WSSC, to be on the site during the entire excavation process.

⑲

The EIS has been revised to reflect these concerns.

⑳

No overload problems are anticipated with the operation of the proposed system.

㉑

These concerns have been discussed in the Final EIS.

㉒

The Final EIS reflects this restriction on dredging activities.

㉓

This will not occur due to the above dredging restriction.

㉔

Use of the incinerators is being thoroughly re-examined at the present time.

㉕

This EIS is limited to 30 mgd AWT. The needs required for this proposal are discussed.

㉖

Compliance with Section 106 of the National Historic Preservation Act has been accomplished.

METROPOLITAN CLEARINGHOUSE

Metropolitan Washington Council of Governments

metropolitan washington
COUNCIL OF GOVERNMENTS
1225 Connecticut Avenue, N.W., Washington, D.C. 20036 223-6800

he comments contained here relate
nly to the adequacy or inadequacy
f the draft environmental impact
tatement prepared for the project
entioned. These comments should
ot be construed as approval or
isapproval of the said project or
ny of the options thereto.

METROPOLITAN CLEARINGHOUSE REVIEW COMMENTS

COG PROJECT NUMBER: 74-M-W/S/EIS-4

PROJECT NAME: Draft Environmental Impact Statement for the Expansion and Upgrading of the Piscataway Wastewater Treatment Facility to 30 MGD AWT

APPLICANT: U.S. Environmental Protection Agency

FEDERAL PROGRAM AND AUTHORIZATION: National Environmental Policy Act, Section 102(2)(c)

PROJECT DESCRIPTION:

The Draft Environmental Impact Statement covers the expansion of the existing Piscataway Wastewater Treatment Plant from its currently mandated capacity limit of 17 MGD to 30 MGD. The expansion will also be accompanied by two other actions intended to relieve the impact of the plant's discharge on the Piscataway Bay the the Potomac River; construction of a pipeline to transmit the plant effluent beyond the Piscataway Bay to the main River channel, and construction of additional facilities to provide an advanced form of wastewater treatment. The effluent pipeline was reviewed under the A-95 Clearinghouse procedures in July, 1972. An environmental assessment for the proposed project prepared by the Washington Suburban Sanitary Commission was reviewed by the Clearinghouse in September, 1973. The review which discusses the site, water quality, air quality, visual impact, and archaeological sites, is attached. The treatment process to be employed at the expanded facility will incorporate some to the techniques studied at 5 MGD test facility that has been operating at the Piscataway Plant since 1972.

The plant expansion and upgrading was recommended by the Potomac Enforcement Conference in 1969 and even further expansion is an essential element of the Maryland Environmental Services "Potomac Metropolitan Area Basin Water Quality Management Plan" which includes plans for Piscataway expansion to serve much of the Maryland portion of the Anacostia Basin and relieve flows from the Blue Plains Treatment Plant. The expansion will accommodate population growth projected for the design service area until nearly the end of the century an

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also allow the elimination of two temporary treatment plants at Andrews Air Force Base and at the Naval Communications Center.

The environmental impacts of the project are listed as those resulting from construction activities which include noise, disruption to vegetation, and the removal of esturaial substrate by dredging. The improvements in water quality are attributed to the elimination of the two military treatment plants which are said to "contribute a substantial proportion of the pollutant loadings to the Tinker's Creek and to Piscataway Creek."

CLEARINGHOUSE COMMENTS:

It is stated that because the new effluent pipeline will reduce the flow through Piscataway Bay, that the Potomac River waters will occupy a greater portion of the Bay's volume than in the recent past, and that this will have an undetermined effect on the water quality of the Bay.

① The Statement indicates that mathematical models show that the Zone II (Broad Creek to Indian Head) of the Potomac River into which the new effluent pipeline will discharge can assimmilate the pollutant loads to be generated by both the expanded Piscataway Plant and the expanded Lower Potomac Plant in Fairfax County which shares discharges into that Zone. The Statement describes the Zone II capacity to be as high as six times that required for these discharges, leaving unaddressed the alternative of not constructing the plant to achieve such strict effluent standards. Such action would significantly reduce the project cost and burden of sludge disposal. The assessment of the Zone's capacity is based on the assumption that zones above and below Zone II will not be overloaded, and the statement contains no information on whether plans in the region will result in overloads to these zones in the forseeable future. It would appear that this should be highlighted as a significant irretrievable commitment of resources and should be addressed in the context of loads from plants planned in the upper estuary which should include plants in Prince William County, Virginia.

② The Impact Statement recognizes that the three proposed sludge incinerators will effect the air quality of the area surrounding the plant. While diffusion modelling shows annual average concentrations of lead and mercury, the Statement points out that any thirty day period may reveal levels as much as five times as high as those shown. Background levels of mercury must be added to those projected to be emitted by the incinerators and no estimate is made of the magnitude of those background levels. A description of the extent and variability of heavy metals concentrations measured in the sludge would be helpful in assessing the basis for the average concentrations used in calculations.

③ Alternatives considered for the disposal of sewage sludge are not as extensive as those presented in discussions before the Health and Environmental Protection Policy Committee of the Council of Governments by WSSC and should be expanded to more accurately reflect the alternatives considered to incineration. The statement that the consideration of only those alternatives that would use the existing wastewater facilities at Piscataway to their fullest for maximum economic efficiency has perhaps restricted the true alternatives which should be explored in the Statement. This is unfortunate because it has concealed the true tradeoffs that may be required in sludge management, is a misstatement of engineering economic procedure, and is inconsistent with Section 4.7 of the Preliminary Guidelines for Facilities Planning issued pursuant to the Federal Water Pollution Control Act Amendments of 1972. This section states that "sunk costs(are not to be)included as monetary cost for plan evaluation and comparison."

In summary, the concerns and issues raised by the Clearinghouse in its September 1973 review of the WSSC environmental assessment have not been addressed in this Draft Environmental Impact Statement. Therefore, the Clearinghouse recommends strongly that the final environmental impact statement address these issues in detail, and requests that a copy of the final environmental impact statement be forwarded to the Clearinghouse by EPA.

STAFF RECOMMENDATION:

The staff recommends endorsement of the comments by the Health and Environmental Protection Policy Committee and the Land Use Policy Committee.

COMMITTEE RECOMMENDATION:

The Land Use Policy Committee endorsed these comments on March 27 and endorsed the comments of its citizen advisory committee to note that:

1. The discharge area of the new effluent pipe in the Potomac cannot be considered as an isolated area. The effect of and on upstream and downstream areas should be a part of the decision. ④

2. The effect and quantity of toxic metals released by incineration should be thoroughly explored. Lead and mercury in particular. ⑤

3. A reexamination should be made to see if the calculations for atmospheric dispersions are adequate. ⑥

4. The increasing cost and unavailability of high grade fuels - both oil and coal - will result in emission problems. Other solutions to advanced waste water treatment should be evaluated as to efficiency, safety and cost. ⑦

5. In consideration of rising fuel costs other methods than incineration for the disposal of sludge should be considered. ⑧

The Health and Environmental Protection Policy Committee endorsed these comments on April 5 and:

1. Requested that a public hearing be held after completion of EPA tests of the incinerator emissions. ⑨

2. Endorsed the comments of its citizen advisory committee to note that the draft EIS indicates that the water quality in Piscataway Creek will not necessarily be improved, and to raise the question of the assumption that the National Park Service will approve the discharge pipe to the Potomac. ⑩

3. Directed that Resolution CR-42-1974 adopted by the Prince George's County Council on March 2[illegible], 1974, and the telegra of March 27, 197[illegible] from EPA to WSSC, be attached to these comments.

metropolitan washington
COUNCIL OF GOVERNMENTS
1225 Connecticut Avenue, N.W., Washington, D.C. 20036 223-6800

METROPOLITAN CLEARINGHOUSE REVIEW COMMENTS

COG PROJECT NUMBER: 74-M-W/S-2

PROJECT NAME: Piscataway Advanced Wastewater Treatment Plant, 30 MGD (WSSC #96.1)

APPLICANT: Washington Suburban Sanitary Commission

FEDERAL AGENCY: Environmental Protection Agency

FEDERAL PROGRAM AND AUTHORIZATION: National Environmental Policy Act of 1969, Section 102(2)(C), Environmental Assessment.

PROJECT DESCRIPTION:

The Washington Suburban Sanitary Commission has submitted an environmental impact assessment for the proposed addition of advanced wastewater treatment at its Piscataway Treatment Plant. The AWT subsystem would be constructed adjacent to existing facilities and would be capable of processing 30 mgd of wastewater. Currently, the plant is limited to 15 mgd; in order for the full 30 mgd capacity to be utilized, an effluent line would have to be constructed which would allow effluent discharge to be made into the main stem of the Potomac rather than into Piscataway Bay, which has a more limited assimilative capacity. A separate impact assessment for the effluent line was forwarded to the U.S. Department of the Interior in July, 1972.

The Site

The project will be located on property currently owned by the WSSC, and will be adjacent to existing secondary treatment facilities. The property is 37 acres in size, and about ten percent is wooded. The site is located in an area which is predominantly residential and recreational in character, containing both unique natural and historic features: the Potomac River and shoreline parkway areas, the proposed Potomac Heritage Trail, Fort Hunt, Fort Washington, and Mt. Vernon. In addition, there are two known archaeological sites in the immediate vicinity of the proposed AWT addition.

Water Quality

Together with the existing facilities, the addition of advanced waste treatment would, by 1976, achieve effluent quality which would have average values of 5 mg/l BOD_5, 3 mg/l total nitrogen, and 0.2 mg/1 phosphorus. This corresponds to removal efficiencies of 96% for BOD_5, 98% for phosphorus and would also meet the nitrogen removal (85%) stipulated by the Potomac Enforcement Conference. Present average loading rates are 6 mg/1 BOD_5, 5.7 mg/1 NH_3N, and 3.1 mg/1 total PO_4P.

In regard to the quality of the receiving water, some immediate improvement in the quality of Piscataway Bay would be expected; however, the improvement would gradually diminish as the plant approached its rated capacity of 30 mgd (assuming the effluent is discharged to the Bay). The impact assessment does not quantify the effect on Piscataway Bay if tertiary effluent is discharged to the estuary, other than to note that the flushing time of the Bay would increase.

The assessment concludes that, in comparing present plant performance (a loading of about 11 mgd with secondary treatment) versus 30 mgd with tertiary treatment, that total phosphorus and inorganic nitrogen loads will decrease 82% and 22% respectively, but that conditions within the Piscataway Bay may not improve significantly because (1) Potomac River water will occupy more of the Bay due to decreased fresh water inflow, and hence greater flushing time, and (2) this Potomac River water will be carrying some of the load being discharged from the Piscataway facility into the River.

Because of this dominance of the Potomac River in the Bay, large-scale changes in 200 plankton, benthos, and fish communities are not expected, although the possible decrease in nutrient availability may reduce phytoplankton (algal) populations.

The expansion of the treatment plant to 30 mgd AWT would, however, make possible the connection of the Andrews Air Force Base and Naval Communication Station treatment plants, thus improving the water quality of Tinker's Creek (into which effluent from these plants is now being discharged), and of Piscataway Creek.

Air Quality and Solid Wastes

In the process of removing organic wastes via tertiary treatment, excess biological wastes will be generated. The impact assessment indicates that, given a 30 mgd operation, sludge loading rates will increase from 64,000 lbs/day for secondary treatment only, to 89,000 lbs/day, dry weight, for the combined plant. Sludge will be incinerated on the WSSC site, with the residue to be trucked to the Brown Station landfill in Prince George's County until such time as the WSSC can develop its own separate landfill for sludge disposal.

The incineration of sludge will be handled by existing facilities on the site. The stack height of the units is 60 feet, and current average design exit gas temperature is 90°F. During calm periods, there could be a significant decrease in the dispersion of stack gases. The assessment notes that recent studies have shown the possibility that sludge incinerators may discharge potentially harmful substances in their stack gases, such as toxic metals and chlorinated hydrocarbons. The WSSC has retained an air quality consultant to fully evaluate emissions from the existing incinerators, and the impact assessment notes that the units may require modification in the future, particularly if standards are revised. The impact assessment does not mention what steps would be taken if the consultant's study shows that emissions exceed current standards. Since the additional sludge to be generated with AWT will be biological in nature, it is expected to contain toxic substances. Incineration of this sludge will take the form of increased particulate emissions. Due to the importance of this issue and the indication by WSSC that it cannot fully address this issue in the impact assessment without the consultant's report, the Clearinghouse requests that it be given an opportunity to review this report upon its completion.

Visual Impact

The project will add materially to the size of the plant. Of the historic sites in the vicinity, Mt. Vernon and Fort Washington provide views of Piscataway Bay, but the existing plant, according to the impact statement, will not be visible from these locations due to the tree cover and low vertical profile of the plant. The effect of the addition to the plant is not specifically mentioned, in terms of visual impact on these historic sites although it is noted that the existing sludge incinerator building, approximately 60 feet high, will be the tallest structure in the expanded plant.

The primary visual impact will be greatest from the residential areas in the Piscataway Hills district, from Farmington Road, and from a 20-acre property across the Bay owned by the M-NCPPC and intended for future development as a water-recreation area.

Archaeological Sites

The immediate area of the WSSC site has historical significance dating to the habitation of the area by the Piscataway Indians during the 17th Century. According to Dr. William Gardner of the Catholic University the tendency for prehistoric aboriginal settlements to be located between the 20 and 100 foot contour intervals, along draws and secondary and tertiary streams, strengthens the possibility that, since the area of proposed expansion fits in all these categories, the area of the Piscataway plant has the possibility of being archaeologically significant.

Presently, there are two known sites in the immediate area near the northern boundary of the WSSC site. In order to mitigate the possibility of damaging any artifacts in the area, the WSSC will instruct project control inspectors to halt work in any areas where artifacts are discovered, and to notify qualified archaeologists of the discovery. Work would proceed after protective measures are taken.

RELATIONSHIP TO THE METROPOLITAN PLANNING PROCESS AND THE ACHIEVEMENT OF AREAWIDE GOALS AND OBJECTIVES:

The proposed expansion and upgrading of the Piscataway Wastewater Treatment Plant is consistent with regional policy in the area of water quality and wastewater treatment. In past years, COG policy has endorsed efforts to reduce water pollution ...

*by supporting efforts to improve the quality of the lower estuary ...

*by supporting the incorporation of technologies in plants to be constructed and in those already in operation which will allow them removal of a greater level of pollutants, remove a large quantity of nutrients, and meet adopted state water quality standards ...

*by supporting the development of additional wastewater treatment capacity by WSSC, consistent with provisions of the "Memorandum of Understanding" adopted water quality standards, anticipated population distribution, consultant studies, and particular attention to the assimilative capacities of Piscataway Bay .

In addition COG's water/sewerage project evaluation system recognizes the priority of those projects which would provide for the consolidation of smaller treatment plants, including those of Federal installations, with larger, more effective plants.

Summary

In summary, the proposed installation of tertiary treatment to the Piscataway sewage treatment plant is consistent with adopted regional plans and objectives. The Clearinghouse has nothing further to add to the WSSC's environmental impact assessment.

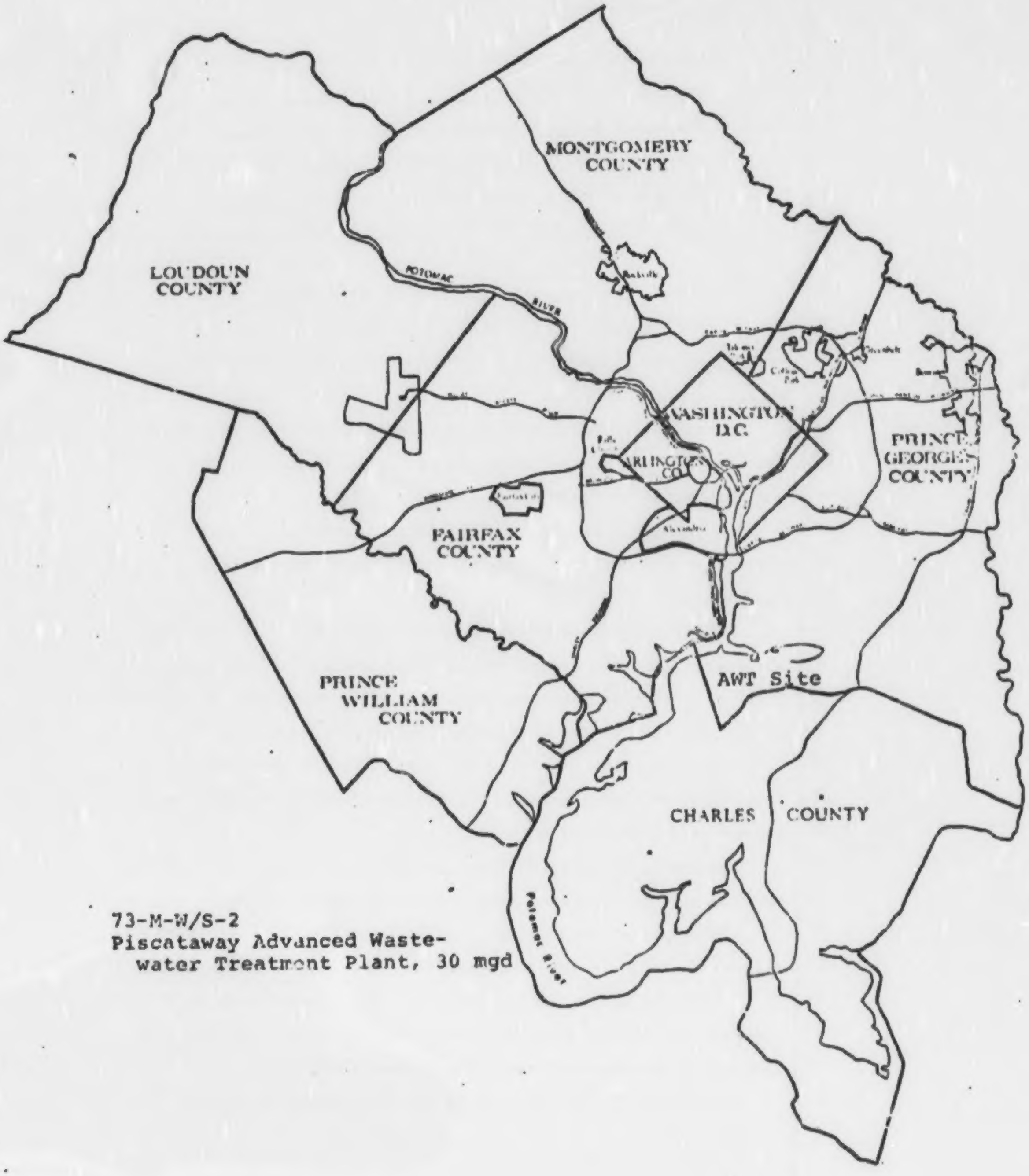
STAFF RECOMMENDATION:

The staff recommends endorsement of these comments by the Land Use Policy Committee and the Health and Environmental Protection Policy Committee.

COMMITTEE RECOMMENDATION:

The Land Use Policy Committee endorsed these comments, with the inclusion of the comments received from the Maryland-National Capital Park and Planning Commission, on September 26, 1973. The Health and Environmental Protection Policy Committee endorsed these comments on September 28, 1973 with the following additions.

That, while endorsing these comments, the HEPPC strongly supports the extension of the plant outfall to the main stream of the Potomac River in order to avoid the continuing overload of Piscataway Bay. The Committee also requested that WSSC come back at some date prior to construction and discuss with the Committee how they are going to handle the sludge disposal.



73-M-W/S-2
Piscataway Advanced Waste-
water Treatment Plant, 30 mgd

COUNTY COUNCIL OF PRINCE GEORGE'S COUNTY, MARYLAND
Legislative Session 1974
Presented By Councilman Potts
Introduced By Councilmen Potts, Burcham, Reeder and Kell
Resolution No. CR-42-1974
Introduced by Council on March 26, 1974

RESOLUTION

WHEREAS, the Environmental Protection Agency, in its effort to clean up the waterways in the United States, has recommended that sludge, the by-product of waste water treatment, be incinerated, and

WHEREAS, reliable sources have questioned this recommendation because of thirteen heavy metals that may pollute the air and be harmful to human beings, and

WHEREAS, there are many sludge incinerators in operation throughout the United States that have not addressed this concern, and

WHEREAS, because there are no National Standards set for these emissions the Washington Suburban Sanitary Commission has hired the Battelle Laboratories to do an environmental assessment on the emission of the Piscataway Incinerator, and

WHEREAS, the Piscataway Treatment Plant is presently digesting the sludge produced by the plant and using land application as the means of disposal, and

WHEREAS, in order to test the incinerator the digestor must be converted to a holding tank for the incinerator, and

WHEREAS, as soon as the testing begins there will be no alternate means of sludge disposal avilable at Piscataway, and

WHEREAS, if the incinerator operation should have to be stopped, for whatever reason, WSSC would be faced with the problem of disposing of many tons of raw sludge, and

WHEREAS, the EPA in their draft Environmental Impact

Statement on the Piscataway Treatment Plant and the Incinerator has stated that the estimated emission of lead from the incinerator will be twenty six (26) pounds per day, and

WHEREAS, there are over seven thousand (7000) residents of Prince George's County, four (4) County schools and over two thousand (2000) school children who live in the area designated by EPA as the danger zone for harmful emissions, and

WHEREAS, some citizens living within this danger zone have had their blood tested at Childrens Hospital for present lead levels, and

WHEREAS, Dr. Fredrick Green, Assistant Director of Childrens Hospital has verified that their present levels which range from 37 to 45 are three times higher than the National average, with 40 being borderline and 59 being cirtical, and

WHEREAS, lead poisoning can lead to irreversible brain damage, blindness or death with no symptons occurring until it is too late, and

WHEREAS, no authorities, federal, state or county, can assure these citizens that with their present high levels of lead in their blood that there is a safe emission level that will not result in lead poisoning, and

WHEREAS, the Prince George's County Council is responsible for the Health, Welfare and Safety of the citizens of this County and must discharge that responsibility to the best of their ability.

THEREFORE BE IT RESOLVED, that we the Prince George's County Council in order to protect the Health, Welfare and Safety of the citizens of Prince George's County do direct the Prince George's County Health Officer to immediately undertake the necessary steps to determine the cause of these high lead levels and we also direct WSSC, in cooperation with the County Health Officer, to present to the County Council a plan to conduct lead level tests of the children who attend the schools within the danger zone, and

BE IT FURTHER RESOLVED, that the County Council immediately bring to the attention of the Secretary of Health, Education and Welfare, and all other appropriate officials, this serious national health problem and urge that the Surgeon General be directed to address the effects of sludge and solid waste incineration emmissions on human beings and to set national health standards for incineration, and

BE IT FURTHER RESOLVED, that the Washington Suburban Sanitary Commission be instructed to immediately prepare an alternate method of sludge disposal for Piscataway and for all other plants located in Prince George's County that plan to dispose of sludge by incineration, and

BE IT FURTHER RESOLVED, that no further incineration of sludge at Piscataway be permitted until the Prince George's County Council has given permission to do so.

Adopted this 26th day of March, 1974.

COUNTY COUNCIL OF PRINCE
GEORGE'S COUNTY, MARYLAND

By: Francis B. Francis
Francis B. Francois
Chairman

ATTEST:

Jean M. Schmuhl, Clerk

175

3/27/74 @ 8:10 a.m.
TELEGRAM RECEIVED IN SECRETARY'S OFFICE

TO: WSSC

FROM: DANIEL J. SNYDER, III
REGIONAL ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY

DEAR SIRS:

U.S. ENVIRONMENTAL PROTECTION AGENCY REQUESTS THE TERMINATION OF INCINERATOR OPERATION AT YOUR PISCATAWAY PLANT PENDING A PRINCE GEORGE'S COUNTY HEALTH DEPARTMENT EVALUATION OF REPORTED HIGH BLOOD LEAD LEVELS IN A FEW AREA CHILDREN AND THE RESULTS OF RECENTLY COMPLETED EPA STACK TESTS.

Taken by G. McCoy, Secretary's Office
Copy to be forwarded to WSSC today.

metropolitan washington
COUNCIL OF GOVERNMENTS
1225 Connecticut Avenue, N.W., Washington, D.C. 20036 223-6800

A-95 METROPOLITAN CLEARINGHOUSE MEMORANDUM

April 11, 1974

TO: Mr. Robert J. Blanco, P.E., Chief
Environmental Impact Branch
U.S. Environmental Protection Agency
6th & Wlanut Streets
Philadelphia, Pennsylvania 19106

SUBJECT: PROJECT NOTIFICATION AND REVIEW FOR

PROJECT: Draft Environmental Impact Statement for the Upgrading and Expansion of the Piscataway Wastewater Treatment Facility - Prince George's County

COG NO.: 74-M-W/S/EIS-4

APPLICANT: U.S. Environmental Protection Agency

The project title, COG number, and the applicant's name should be used in all future correspondence with COG concerning this proposed project.

PLEASE NOTE ACTION INDICATED BY CHECK MARK IN BOX BELOW OR ON REVERSE

PROJECT NOTIFICATION

☐ The Project Notification for the project referenced above was received on ____________________ and has been referred to appropriate parties (see attached list) for their review and comment. This review will be conducted as expeditiously as possible.

☐ A copy of the Project Notification for the project referenced above is enclosed for your review and comment, in accordance with OMB Circular A-95 review requirements. Your review should focus on the intended application's compatibility with the plans, programs, and objectives of your organization. You may indicate below your interest in and/or comments concerning the proposed project by returning this sheet to the Metropolitan Clearinghouse by ______________________________.

This organization:

___ does not wish to comment on the above project.
___ has further interest and/or questions concerning the above project and wishes to confer with the applicant.
___ is interested in the above project and wishes to make the following comments: (use attachment)
___ will submit comments concerning the above project by ______________.
___ desires an extension of time until ____________________ for further consideration of this project. (Subject to certain restraints imposed by the OMB Circular.)
___ has reviewed the project referenced above, finds it in conformance with our policies, and recommends a favorable Metropolitan Clearinghouse review.

Signature ______________________________

Organization ______________________________

ADDITIONAL INFORMATION

☐ One or more of the reviewing organizations has questions about or interest in this project and wishes to confer with the applicant. A conference between the applicant and the interested parties has been scheduled for ____________ at ______________ in our offices. Please confirm whether you plan to attend this conference by calling not later than ____________________.

☐ Please refer to the attached "Purpose of Conference" explanation sheet for additional information.

☐ A Clearinghouse conference has been held on the project referenced above, and a summary of its proceedings is transmitted herewith for your information.

☐ We have reviewed the project referenced above. Based on this review and the response from Clearinghouse referrals, we request

____ Additional information as noted on the attached sheet;
____ The opportunity to review the final application before it is submitted to the Federal agency.

☐ We have received on ______________ the requested (information) (final application) on the project referenced above. This has been forwarded to interested parties for review and comment. An effort will be made to complete the review within 30 days.

☐ A copy of the (information) (final application) requested for the project referenced above is enclosed for your review and comment. Please forward your comments to the Clearinghouse not later than ________________________.

FINAL DISPOSITION

☐ We have concluded review of the project referenced above. We have determined as a result of this review that while the project may be of local significance, its nature does not warrant metropolitan comments. A copy of this memorandum and attachments should accompany your application to indicate the Metropolitan Clearinghouse review has been completed.

☐ We have concluded review of the project referenced above. We have determined as a result of this review that the project is in general accord with the metropolitan planning process and the Council of Governments' adopted policies. A copy of this memorandum and attachments should accompany your application to indicate the Metropolitan Clearinghouse review has been completed.

☑ We have concluded review of the project referenced above. The Council of Governments submits, herewith, the attached Metropolitan Clearinghouse Review Comments. A copy of this memorandum and the attached comments should accompany your application when submitted to the Federal agency to indicate the Metropolitan Clearinghouse review has been completed.

Executive Director

Correspondence concerning Metropolitan Clearinghouse review matters should be addressed to Mr. Walter A. Scheiber, Executive Director. The staff may be reached by telephone at 223-6800, ext. 301.

WE APPRECIATE YOUR COOPERATION

Mr. [illegible]

metropolitan washington
COUNCIL OF GOVERNMENTS
1225 Connecticut Avenue, N.W., Washington, D.C. 20036 223-6800

A-95 METROPOLITAN CLEARINGHOUSE MEMORANDUM

February 21, 1974

TO: MR. JOHN P. HEWITT, EXEC. DIR.
M-NCPPC
8787 GEORGIA AVENUE
SILVER SPRING, MD. 20907

IT IS OUR UNDERSTANDING THAT COPIES OF THE DOCUMENT HAVE BEEN SENT TO YOU DIRECTLY FROM EPA. IF YOU NEED FURTHER COPIES PLEASE LET US KNOW.

SUBJECT: PROJECT NOTIFICATION AND REVIEW FOR

PROJECT: Draft Environmental Impact Statement for the Upgrading and Expansion of the Piscataway Wastewater Treatment Facility - Prince George's County

COG NO.: 74-M-W/S/EIS-4

APPLICANT: U.S. Environmental Protection Agency

The project title, COG number, and the applicant's name should be used in all future correspondence with COG concerning this proposed project.

OFFICE OF THE DIRECTOR OF THE MARYLAND NATIONAL CAPITAL PARK AND PLANNING COMMISSION
FEB 22 1974
SILVER SPRING, MD

PLEASE NOTE ACTION INDICATED BY CHECK MARK IN BOX BELOW OR ON REVERSE

PROJECT NOTIFICATION

☐ The Project Notification for the project referenced above was received on ________________ and has been referred to appropriate parties (see attached list) for their review and comment. This review will be conducted as expeditiously as possible.

☑ A copy of the Project Notification for the project referenced above is enclosed for your review and comment, in accordance with OMB Circular A-95 review requirements. Your review should focus on the intended application's compatibility with the plans, programs, and objectives of your organization. You may indicate below your interest in and/or comments concerning the proposed project by returning this sheet to the Metropolitan Clearinghouse by MAR 7 1974.

This organization:

___ does not wish to comment on the above project.
___ has further interest and/or questions concerning the above project and wishes to confer with the applicant.
X is interested in the above project and wishes to make the following comments: (use attachment)
___ will submit comments concerning the above project by ____________.
___ desires an extension of time until ________________ for further consideration of this project. (Subject to certain restraints imposed by the OMB Circular.)
___ has reviewed the project referenced above, finds it in conformance with our policies, and recommends a favorable Metropolitan Clearinghouse review.

Signature ______________________

Organization M-NCPPC 3/7/74

COMMENTS

The Prince George's County Planning Board urges immediate approval of the Draft Environmental Impact Statement for the Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 mgd AWT.

We are pleased that construction of the 108" outfall line to the Potomac Estuary is also considered as part of the Draft EIS. Both projects are vital to County and State development policies and programs for the Potomac River Basin. The need for the proposed outfall line can not be overemphasized since the full 30 mgd AWT plant can only be used in conjunction with the outfall line to the mainstem of the Potomac River.

Although we urge immediate approval of these important projects, we do have some reservations about the proposed methods of sludge processing. In view of air quality and energy constraints, we do not feel that it is wise to become locked into a program of incineration.

Reference is made to p. 132 of the Draft EIS which states that, "Rather high levels of lead and mercury would occur very close to the plant." If the plant is eventually expanded to 95 mgd as programmed by the County and State and sludge incineration is also expanded, the potential for serious air quality deterioration will also increase.

Another aspect of sludge incineration which should be examined further is the use of #2 Fuel Oil in the incineration process. Reference is made to page 142 of the Draft EIS which states that each incineration will consume approximately 60 gallons of #2 Fuel Oil per hour. With two incinerators operating constantly the total amount of fuel required per year would be approximately 1,051,200 gallons or enough to heat approximately 700 homes for a year. In view of the present energy "crises" all possible alternatives to sludge incineration should be considered. The economics of various processes should be reevaluated in view of the energy problem and a contingency plan should be developed as suggested on p. 147 of the Draft EIS. Hopefully WSSC will take the lead in research toward developing better sludge processing methods such as pyrolysis. Our goal should be the recycling of the sludge for beneficial uses to the extent practical.

SUMMARY

The Prince George's County Planning Board urges immediate approval of the Draft EIS for the 30 mgd AWT facility at Piscataway and the 108" outfall line to the Potomac Estuary. Both of these projects are vital to County and State efforts to clean up the Potomac River.

We do have certain reservations concerning sludge incineration in view of air quality constraints and the energy "crises"; however, these reservations should not delay approval of these much need projects.

metropolitan washington
COUNCIL OF GOVERNMENTS
1225 Connecticut Avenue, N.W., Washington, D.C. 20036 223-6800

A-95 METROPOLITAN CLEARINGHOUSE MEMORANDUM

February 21, 1974

TO: HON. JAMES P. GLEASON
MONTG'Y. COUNTY EXECUTIVE
COUNTY OFFICE BUILDING
ROCKVILLE, MARYLAND 20850

IT IS OUR UNDERSTANDING THAT COPIES OF THE DOCUMENT HAVE BEEN SENT TO YOU DIRECTLY FROM EPA. IF YOU NEED FURTHER COPIES PLEASE LET US KNOW.

#751-4

SUBJECT: PROJECT NOTIFICATION AND REVIEW FOR

PROJECT: Draft Environmental Impact Statement for the Upgrading and Expansion of the Piscataway Wastewater Treatment Facility - Prince George's County

COG NO.: 74-M-W/S/EIS-4

APPLICANT: U.S. Environmental Protection Agency

> The project title, COG number, and the applicant's name should be used in all future correspondence with COG concerning this proposed project.

PLEASE NOTE ACTION INDICATED BY CHECK MARK IN BOX BELOW OR ON REVERSE

PROJECT NOTIFICATION

☐ The Project Notification for the project referenced above was received on ____________ and has been referred to appropriate parties (see attached list) for their review and comment. This review will be conducted as expeditiously as possible.

☑ A copy of the Project Notification for the project referenced above is enclosed for your review and comment, in accordance with OMB Circular A-95 review requirements. Your review should focus on the intended application's compatibility with the plans, programs, and objectives of your organization. You may indicate below your interest in and/or comments concerning the proposed project by returning this sheet to the Metropolitan Clearinghouse by MAR 7 1974.

This organization:

___ does not wish to comment on the above project.
___ has further interest and/or questions concerning the above project and wishes to confer with the applicant.
___ is interested in the above project and wishes to make the following comments: (use attachment)
___ will submit comments concerning the above project by ____________.
___ desires an extension of time until ______ ____________ for further consideration of this project. (Subject to certain restraints imposed by the OMB Circular.)
✓ has reviewed the project referenced above, finds it in conformance with our policies, and recommends a favorable Metropolitan Clearinghouse review. We support the expansion in accordance with the Maryland plan.

Signature ____________

Organization Office of Budget and Research

District of Columbia • Arlington County • Fairfax County • Loudoun County • Montgomery County • Prince George's County • Prince William County
Alexandria • Bowie • College Park • Fairfax City • Falls Church • Greenbelt • Rockville • Takoma Park

MONTGOMERY COUNTY COUNCIL
ROCKVILLE, MARYLAND

COUNCIL PRESIDENT

MAR 14 1974

Mr. Walter A. Scheiber,
Executive Director
Council of Governments
1225 Connecticut Avenue, N.W.
Washington, D. C. 20036

Dear Mr. Scheiber:

Reference is made to the COG A-95 Metropolitan Clearinghouse Memorandum number 74-M-W/S/EIS-4, for the "Draft Environmental Impact Statement for the Upgrading and Expansion of the Piscataway Wastewater Treatment Facility - Prince George's County."

For your information, the attached Council - Executive joint letter was entered into the public hearing record on this matter in support of the Piscataway AWT.

Very truly yours,

Neal Potter

Neal Potter, President
Montgomery County Council

NP:ps

March 7, 1974

Mr. Daniel J. Snyder, III
Regional Administrator
United States Environmental Protection
Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

The County has reviewed the Draft Environmental Impact Statement dated December 28, 1973, concerning the upgrading and expansion of the WSSC Piscataway plant to a 30 mgd Advanced Wastewater Treatment Facility (AWT). The Montgomery County Government submits the following comments on the project for inclusion in the record of the public hearing of March 7, 1974:

1. Montgomery County fully supports the immediate expansion and upgrading of the Piscataway treatment plant to a 30 mgd AWT facility. The County is cooperating with the other local jurisdictions in the metropolitan region and with the States of Maryland and Virginia in efforts to reduce the pollution of the Potomac River and its tributaries. The Piscataway project is a vital element to this regional wastewater management plan.

2. The County also endorses the further expansion of the Piscataway facility to an AWT capacity of 5 mgd at an early date. Montgomery County is proceeding with its plans for a major wastewater treatment facility at Dickerson consistent with the draft Potomac Metropolitan Area Basin Water Quality Management Plan. Successful and cost-effective projected wastewater flow management over the next several decades is dependent upon the expansion of Piscataway as well as construction of the Montgomery County AWT Plant.

3. The immediate construction of the proposed outfall line from the Piscataway plant into the main stream of the Potomac is specifically endorsed as a part of the Piscatawey

expansion to 30 mgd and as a logical part of the long range wastewater needs for the Region.

Sincerely,

James P. Gleason
County Executive

Neal Potter
Council President

JPG/NP:mmg

cc: Dr. Floyd D. Peterson
Mr. Francis E. Francois
Mr. William W. Gullett

Response: Metropolitan Washington Council of Governments

①

The Potomac Estuary has been classified water quality limited for nutrients by the State of Maryland. This designation indicates that nutrient loadings are mainly responsible for water quality problems in the Estuary. This classification is in agreement with the recommendations of the Potomac River-Metropolitan Washington Enforcement Conference. The degree of treatment proposed is compatible with stream criteria. The EIS has been revised to indicate the effects of potential Zone I overloads to Zone II. As a result of this evaluation, it appears that Zone II criteria proposed in EPA Technical Report #35 will be met. Since Zone II criteria will be met, even with potential overloads to Zone I, no significant negative impacts are anticipated in Zone III as a result of treated wastewater discharge to the upper estuary. It should be noted that since Zone III's assimilation capacity is greater than that of Zone II and anticipated treated wastewater discharges are less than Zone II, it appears that Zone III criteria will be met.

②

Part of the extensive testing program being performed by Battelle-Columbus Laboratories and the University of Maryland will be analyses of sludge contents and background levels of toxic materials. As noted elsewhere, it is long-term averages for many toxic materials which are related to public health.

③

The EIS has been revised to present a more extensive discussion of sludge handling and disposal alternatives.

④

See #1 above.

⑤

As discussed in Section IV.B.4. and Appendixes A, B, and C, preliminary findings concerning lead and mercury have already been made. Attachment 4, Appendix A, outlines the thorough studies proposed concerning a full range of toxic materials.

⑥

Atmospheric dispersion calculations are only as accurate as the emissions and meteorological data used. Accurate emissions and ambient air quality data will be collected and analyzed, and reported in a Supplement to this EIS.

⑦

Emissions of SO_x are directly related to the sulfur content of the auxiliary fuel used in the incinerator. See response #3, NCPC.

⑧

The EIS has been revised in consideration of these concerns.

⑨

The EPA Regional Administrator has not yet determined whether or not to hold an additional public hearing for the Piscataway project. After distribution of the Supplement, such a hearing will be considered.

⑩

EPA fully expects the National Park Service to issue a construction permit, with restrictive but acceptable conditions, for the laying of the outfall pipe. The water quality of Piscataway Creek will be improved as a result of eliminating treated sewage discharges and conveying wastewater flows from Andrews AFB and the Cheltenham Naval Station to the Piscataway Treatment Plant. The water quality of Piscataway Bay is highly dependent upon the water quality of the Potomac Estuary. Therefore, the water quality of the Bay will not be significantly improved by the Piscataway Project, but will improve as treatment plants in the upper estuary are upgraded and a resultant improvement to estuary water quality is realized.

STATE CLEARINGHOUSES (STATE AGENCIES)

Maryland Department of State Planning

Maryland Department of State Planning

Commonwealth of Virginia, Governor's Office
Council on the Environment

Commonwealth of Virginia, State Air Pollution Control Board

Commonwealth of Virginia, State Water Control Board

MARYLAND
DEPARTMENT OF STATE PLANNING
301 WEST PRESTON STREET
BALTIMORE MARYLAND 21201
TELEPHONE 301 383 2451

MARVIN MANDEL
GOVERNOR

VLADIMIR A. WAHBE
SECRETARY OF STATE PLANNING
~~EDWIN [illegible] POWELL~~ JR
DEPUTY SECRETARY

April 11, 1974

Mr. Daniel J. Snyder, III
Regional Administrator
U. S. Environmental Protection Agency
Region III, 6th & Walnut Streets
Philadelphia, Pennsylvania 19106

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT REVIEW

Applicant: U. S. Environmental Protection Agency

Project; Upgrading and Expansion of the WSSC Piscataway (Draft Environmental Impact Statement Review)
State Clearinghouse Control Number: 74-2-841

State Clearinghouse Contact: Warren D. Hodges - 383-2467

Dear Mr. Snyder:

The State Clearinghouse has reviewed the above project. In accordance with the procedures established by the Office of Management and Budget Circular A-95, the State Clearinghouse received comments (copies attached) from the following:

Department of Economic & Community Development: indicated that the Statement is consistent with the interests of their agency.

Department of Health & Mental Hygiene: the Division of Solid Waste Control and the Division of Water and Sewerage indicated that the Statement is consistent with the interests of their agencies. The Bureau of Air Quality Control indicated that the Statement is basically consistent with their agency's requirements. The Bureau also made reference to an apparent misstatement on page 132 of the Statement which should be corrected and they noted the need for a concerted effort to discover and control the sources of mercury water pollution.

Department of Natural Resources: endorsed the favorable orientation of the Statement but noted several specific areas in the Statement which needed clarification in regard to projected sewerage flows and future water supply needs. The Department also noted the considerations under review in regard to the issuance of a State Discharge Permit.

We hope these comments will assist you in the preparation of your final Statement and we look forward to continued cooperation with your office.

Sincerely,

Vladimir Wahbe

Att.

cc: Mr. Robert Miller
Mr. Raymond Karpen
Mr. Earl Quance
Mr. George Ferreri
Mr. Paul McKee

191

Maryland Department of State Planning
State Office Building
301 West Preston Street
Baltimore, Maryland 21201

Date: 3/13/74

MAR 14 1974

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT REVIEW

Applicant: U. S. Environmental Protection Agency

Project: Draft Environmental Impact Statement-Upgrading & Expansion of the WSSC Piscataway Wastewater Treatment Plant.

State Clearinghouse Control Number: 74-2-841

We have reviewed the above draft environmental impact statement and our comments as to the adequacy of treatment of physical, ecological, and sociological effects of concern are shown below:

	Check (X) for each item	
	None	Comment enclosed
1. Additional specific effects which should be assessed:	X	
2. Additional alternatives which should be considered:	X	
3. Better or more appropriate measures and standards which should be used to evaluate environmental effects:	X	
4. Additional control measures which should be applied to reduce adverse environmental effects or to avoid or minimize the irreversible or irretrievable commitment of resources:	X	
5. Our assessment of how serious the environmental damage from this project might be, using the best alternative and control measures:	X	
6. We identify issues which require further discussion of resolution as shown:	X	

Signature Robert Miller
Title Acting Director
Agency Community Devel. Admin

Maryland Department of State Planning
State Office Building
301 West Preston Street
Baltimore, Maryland 21201

Date:

[illegible]
MAR 1 - 1974
[illegible]

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT REVIEW

Applicant: U.S. Environmental Protection Agency

Project: Draft Environmental Impact Statement-Upgrading & Expansion of the WSSC Piscataway Wastewater Treatment Plant

State Clearinghouse Control Number: 74-2-841

We have reviewed the above draft environmental impact statement and our comments as to the adequacy of treatment of physical, ecological, and sociological effects of concern are shown below:

	Check (X) for each item	
	None	Comment enclosed
1. Additional specific effects which should be assessed:	X	
2. Additional alternatives which should be considered:	X	
3. Better or more appropriate measures and standards which should be used to evaluate environmental effects:	X	
4. Additional control measures which should be applied to reduce adverse environmental effects or to avoid or minimize the irreversible or irretrievable commitment of resources:	X	
5. Our assessment of how serious the environmental damage from this project might be, using the best alternative and control measures:	X	
6. We identify issues which require further discussion of resolution as shown:	X	

We consider this project to be highly essential.

Raymond J Karpen

Signature Raymond J. Karpen, Chief

Title Division of Solid Waste Control

Agency Environmental Health Administration

Maryland Department of State Planning
State Office Building
301 West Preston Street
Baltimore, Maryland 21201

Date: March 1, 1974

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT REVIEW

Applicant: U. S. Environmental Protection Agency

Project: Draft Environmental Impact Statement - Upgrading & Expansion of the WSSC Piscataway Wastewater Treatment Plant.

State Clearinghouse Control Number: 74-2-841

We have reviewed the above draft environmental impact statement and our comments as to the adequacy of treatment of physical, ecological, and sociological effects of concern are shown below:

	Check (X) for each item	
	None	Comment enclosed
1. Additional specific effects which should be assessed:	X	
2. Additional alternatives which should be considered:	X	
3. Better or more appropriate measures and standards which should be used to evaluate environmental effects:	X	
4. Additional control measures which should be applied to reduce adverse environmental effects or to avoid or minimize the irreversible or irretrievable commitment of resources:	X	
5. Our assessment of how serious the environmental damage from this project might be, using the best alternative and control measures:	X	
6. We identify issues which require further discussion of resolution as shown:	X	

Signature Earl S. Quance

Title Mr. Earl S. Quance, P.E., Chief
Division of Water and Sewerage

Agency Environmental Health Administration

cc: Department of
Natural Resources

Maryland Department of State Planning
State Office Building
301 West Preston Street
Baltimore, Maryland 21201 Date:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT REVIEW

Applicant: U.S. Environmental Protection Agency

Project: Draft Environmental Impact Statement-Upgrading & Expansion of the WSSC Piscataway Wastewater Treatment Plant

State Clearinghouse Control Number: 74-2-841

We have reviewed the above draft environmental impact statement and our comments as to the adequacy of treatment of physical, ecological, and sociological effects of concern are shown below:

	Check (X) for each item	
	None	Comment enclosed
1. Additional specific effects which should be assessed:	X	
2. Additional alternatives which should be considered:	X	
3. Better or more appropriate measures and standards which should be used to evaluate environmental effects:	X	
4. Additional control measures which should be applied to reduce adverse environmental effects or to avoid or minimize the irreversible or irretrievable commitment of resources:		Find and control source of mercury water pollution.
5. Our assessment of how serious the environmental damage from this project might be, using the best alternative and control measures:		Appears to be more than adequate.
6. We identify issues which require further discussion of resolution as shown:	X	

George P Ferreri

Signature George P. Ferreri

Title Bureau of Air
Director, Quality Control

Agency Dept. of Hlth. & Mental Hygiene
Environmental Hlth. Admin.

MAR 4 1974

State of Maryland

DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Neil Solomon, M.D., Ph.D., Secretary
ENVIRONMENTAL HEALTH ADMINISTRATION
610 N. HOWARD STREET • BALTIMORE, MARYLAND 21201 • Area Code 301 • 383-2779

February 28, 1974

Mr. Warren D. Hodges
Chief, State Clearinghouse
Maryland Department of State Planning
301 West Preston Street
Baltimore, Maryland 21201

SUBJECT: Draft Environmental Impact Statement Review-
Piscataway Sewage Treatment Plant

Dear Mr. Hodges:

At your request of February 15, 1974, we have reviewed the subject Environmental Impact Statement draft and have the following comments.

In general, the Impact Statement draft is consistent with our review and requirements pertaining to the Piscataway Sewage Treatment Plant.

There is, however, an apparent misstatement in the draft which should be corrected in the final document. On page 132 the draft discusses two "caveats" concerning air quality impact and concludes with the following statement. "Consequently, if the sewage facility is expanded to 95 MGD or greater, these caveats may preclude alternative means of sludge disposal other than incineration." This statement obviously was intended to say that these caveats may preclude the use of incineration. ①

On this latter point, we believe that the ground level concentration data presented in Appendix B indicate that a considerable expansion of the incinerator throughput could be made before the ground level concentration of mercury reached the one microgram per cubic meter level employed by EPA in ② determining emission standard for chlor-alkali plants. This assumes that the mercury content of the sludge does not increase. A concerted effort should be made to discover and control the major sources of mercury water pollution.

Sincerely yours,

George P Ferreri

George P. Ferreri, Director
Bureau of Air Quality Control

GPF:EBR:mba

MAR 29 1974

Maryland Department of State Planning
State Office Building
301 West Preston Street
Baltimore, Maryland 21201

Date: March 27, 1974

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT REVIEW

Applicant: U.S. Environmental Protection Agency

Project: Draft Environmental Impact Statement-Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Plant

State Clearinghouse Control Number: 74-2-841

We have reviewed the above draft environmental impact statement and our comments as to the adequacy of treatment of physical, ecological, and sociological effects of concern are shown below:

	Check (X) for each item	
	None	Comment enclosed
1. Additional specific effects which should be assessed:	X	
2. Additional alternatives which should be considered:	X	
3. Better or more appropriate measures and standards which should be used to evaluate environmental effects:	X	
4. Additional control measures which should be applied to reduce adverse environmental effects or to avoid or minimize the irreversible or irretrievable commitment of resources:	X	
5. Our assessment of how serious the environmental damage from this project might be, using the best alternative and control measures:	X	
6. We identify issues which require further discussion of resolution as shown:		XX

Signature ______________

Title Assistant Secretary

Agency Dept. of Natural Resources

JAMES B. COULTER
SECRETARY

JOSEPH H. MANNING
DEPUTY SECRETARY

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
TAWES STATE OFFICE BUILDING
ANNAPOLIS 21401

March 27, 1974

COMMENTS OF THE DEPARTMENT OF NATURAL RESOURCES ON PROJECT 74-2-841

Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Plant - Draft EIS

The Department of Natural Resources favors the addition of AWT capacity at Piscataway and the construction of an outfall line to the Potomac as rapidly as possible. The Department endorses the favorable orientation of EPA's draft Environmental Impact Statement. However, this report should be strengthened by correcting some inaccuracies in the data.

1. In discussing future plans for Piscataway and related facilities (pp. 18-22) several different reports are cited and data from the different reports are erroneously represented.
   a. The "Potomac-Metropolitan Area Basin Water Quality Management Plan" is a State plan, not a Maryland Environmental Service plan. ③
   b. The Basin Plan draft clearly states that revised flow projections, different from those used by Bechtel, had been made available - these are used in the Basin Plan. However, the draft EIS mixes flow projections from the Bechtel and State reports in such a way as to misrepresent expected future conditions. ④

The Piscataway treatment plant will accept excess flows from the Blue Plains Service Area which exceed Blue Plains' 309 mgd capacity. Maryland flows to Blue Plains must be curtailed below this State's purchased capacity in order to accommodate increases in flow from the District of Columbia and tributary areas of Virginia.

The Basin Plan distinguishes between "Maryland Excess Blue Plains Flow" and "Total Excess Blue Plains Flow." The distinction is not clear in the draft EIS, leading to errors in the flows and dates on page 22. "Maryland Excess Blue Plains Flow" means flows from Maryland jurisdictions which total more than Maryland's capacity rights in Blue Plains under the Memorandum of Understanding. The figure of 125 mgd (page 22, EIS) bears no discernible relation to this definition. "Total Excess Blue Plains Flow" is whatever flow in the present Blue Plains Service District exceeds the capacity (309 mgd) of the plant, regardless of jurisdiction of origin.

In order to accommodate total excess Blue Plains flow in accordance with the higher flow estimates, capacity of 95 mgd would be exceeded in about 1991, suggesting that the first expansion (1978-83) be to 110 mgd in order to avoid additional expansion within less than 10 years. If 110 mgd capacity were to be built initially, a second expansion would be required to be on line by 1993 or 1994. To accommodate currently projected flows to the year 2000, this second expansion should bring total capacity at Piscataway to about 152 mgd.

c. Figure 9 in the draft EIS is out-of-date. The draft Basin Plan presents a more representative picture of future regional sewerage configuration. ⑤

2. Table 11 (page 42) is based on old data and does not reflect actual recent performance of the existing Piscataway Sewage Treatment Plant. Performance is better than the table indicates. ⑥

3. In discussing future water supply needs (pp. 46-47) the draft EIS uses estimates which are out-of-date and on the high side. The Washington Area Interstate Water Resources Program Report to the Governors of January, 1973 should be cited since it gives more current information. ⑦

4. Specific estimates are available and published for estimating the cost of the expansion of Piscataway to 95 mgd. These should be used rather than the "rule-of-thumb approximation." ⑧

The proposed efflent limitations to be achieved and the point of discharge evaluation for the 30 mgd Advanced Wastewater Treatment Plant are currently under review as one step in the procedure for issuance of a State Discharge and NPDES Permit.

A permit will not be issued until the actual point of discharge has been resolved. A permit is currently being processed for a discharge of 15 mgd of secondary treatment effluent to Piscataway Bay.

Response: Maryland State Clearinghouse

Department of Health and Mental Hygiene

①

The EIS has been so corrected.

②

EPA does assume that the mercury content of the sludge will not significantly change and agrees with the point made in this remark concerning the need to discover and control the major sources of mercury water pollution. It is expected that the Battelle studies will be useful in this regard.

Department of Natural Resources

③

The EIS has been so corrected.

④

Using the updated Draft Basin Plan, discussions on wastewater flows have been clarified.

⑤

Figure 9 presented in the Draft EIS has been replaced with the configuration presented in the Draft Basin Plan.

⑥

Table 11 has been updated to reflect recent performance of the Piscataway Facility.

⑦

The Washington Area Interstate Water Resources Program Report to the Governors of January, 1973, was not available to this office at the time of printing; however, more up-to-date data concerning water supply has been included in this section of the Final EIS.

⑧

This Section of the EIS has been revised.

MARYLAND
DEPARTMENT OF STATE PLANNING
301 WEST PRESTON STREET
BALTIMORE, MARYLAND 21201
TELEPHONE: 301-383-2451

MARVIN MANDEL
GOVERNOR

VLADIMIR A. WAHBE
SECRETARY OF STATE PLANNING
EDWIN L. POWELL, JR
DEPUTY SECRETARY

April 23, 1974

Mr. Steve Torok
EPA Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Steve:

Enclosed are our comments on the Piscataway AWT Environmental Impact Statement. Since I missed the State Clearinghouse deadline, I thought I would send you a set directly. If you have any questions, please call me.

Sincerely,

Laurence S. Fogelson
Natural Resources Planner

Piscataway AWT - Environmental Impact Statement

Adequate treatment of sewage in the Piscataway-Anacostia area demands increased capacity and advanced treatment procedures. Utilizing the site and present facilities of the Piscataway Sewage Treatment Plant seems to be the most cost-effective approach. We therefore concur with the proposal for construction of an outfall through National Park Service land to a point of discharge into the Potomac River at Mockley Point. This interceptor will be designed for ultimate flows to be treated at the Piscataway site.

According to the Environmental Impact Statement, Page 130, the ability of the Potomac Estuary to assimilate 30 mgd of effluent without substantially degrading the water quality, and possibly 95 mgd seems certain. It is not clear, however, that the ultimate demands of 110 mgd, or 155 mgd using the Washington Suburban Sanitary Commission's figures, will even be able to be assimilated in the Potomac at the discharge point. The interrelationship between ultimate capacity at this discharge point and the design capacity of the outfall to the Mockley Point point of discharge should be clearly stated. Additionally, what expansion alternatives are available if this discharge site cannot be utilized for the full design capacity? ①

The issue concerning the connection of Andrews Air Force Base to the Piscataway system was discussed, but no final agreements have been reached. The impact statement should more thoroughly discuss the future quality of the water with respect to all alternatives for the Base. In order to preserve and improve stream quality, it is important to resolve the status of connections of these military systems to the Piscataway system. ②

The procedure for treating and disposing of the sludge generated at the site was not adequately discussed. It appeared that the decision to incinerate sludge was made before the impact statement was written, and taken as an assumption by EPA. A serious question should be raised concerning the desirability and feasibility of incinerating the sludge, especially with respect to air pollution, and the alternatives thoroughly researched. The quality of the environment and the health of the inhabitants of the area should be the major consideration of such studies. ③

Finally, we feel an initial decision should be made as to whether the Potomac can assimilate 110 mgd rather than 95 mgd within water quality standards. An addition of 65 mgd to the present 30 mgd treatment plant, rather than an addition of 80 mgd, does not appear to be logical given projected demands unless this limitatio is set to allow studies of the effect of the effluent on water quality, wastewater characteristics, and anticipated improvements in treatment technology. Depending upon which figures are used, expansion beyond 110 mgd may still be necessary for treatment of ultimate demands. ④

Finally, this impact statement is not self-explanatory, especially with respect to flows. Considerable editing is necessary to clarify the flow projections of the Washington Suburban Sanitary Commission and Prince George's County, and the year 2000 demands. Several documents, including the Prince George's County Water and Sewerage Plan and the Potomac Metropolitan Basin Water Quality Management Plan, had to be referenced to clarify these varying projections. Such referencing should not be necessary for comprehension of an impact statement. ⑤

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best available copy.

Response: Maryland Department of State Planning

①

The EIS has been revised and updated with additional information that indicates the ability of the Potomac Estuary to assimilate ultimate flows from the proposed discharge point in the event the Piscataway facility is expanded.

②

This issue has been discussed in the Final EIS.

③

Alternatives to sludge treatment and disposal have been re-evaluated and are discussed in the Final EIS.

④

See #1.

⑤

The discussion on wastewater flows in the D.C. area has been clarified in the Final EIS.

Received
6/14/74

COMMONWEALTH OF VIRGINIA
GOVERNOR'S OFFICE
COUNCIL ON THE ENVIRONMENT
EIGHTH STREET OFFICE BUILDING
RICHMOND 23219

GERALD P. MCCARTHY
EXECUTIVE DIRECTOR

MEMBERS
JOHN W. HANES, JR.
CHAIRMAN
FITZGERALD BEMISS
NORMAN M. COLE, JR.
PAUL E. WILKINS
CHARLES W. WILLIAMS

April 19, 1974

Mr. Daniel J. Snyder
Regional Administrator
Environmental Protection Agency
Curtis Building
6th and Walnut Street
Philadelphia, Pennsylvania 19106

Subject: Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 MGD AWT (3-OGC-IS-M-I)

Dear Mr. Snyder:

We have coordinated a State agency review of the draft environmental statement for the subject project. The following agencies participated in this review:

Division of State Planning and Community Affairs
State Water Control Board
Department of Health
Marine Resources Commission
State Air Pollution Control Board
Virginia Institute of Marine Science
Soil and Water Conservation Commission
Commission of Outdoor Recreation
Historic Landmarks Commission
Department of Agriculture and Commerce
Department of Conservation and Economic Development
Northern Virginia Planning District Commission

Based on the response received, we are pleased to state on behalf of the Commonwealth of Virginia, that we have no objection at this time which would justify our opposition to the proposed project. However, several agencies submitted comments which we would like to bring to your attention.

The overriding concern of the State Water Control Board with regard to the subject project is the proposed quality of effluent to be discharged into the Potomac River. Several years ago, the Potomac River Enforcement Conference established limits on pollutant loadings to the Potomac River. The Conference further recommended allowable levels of treatment for wastewater facilities discharging into tributaries or embayments of the Potomac River. In 1971, the Virginia State Water Control Board adopted water quality standards specifically applicable to effluents discharging into tributaries and embayments from Jones Point to Marlboro Point. All Virginia plants within the Metropolitan Area are required to comply with State standards or the Potomac Enforcement Conference Recommendations, whichever are more stringent.

The effluent limits for the District of Columbia's Blue Plains Plant are based on the Potomac Enforcement Conference Recommendations. The quality of effluent is similar to that required by the State Water Control Board embayment standards. ①

The subject document indicates that the quality of effluent to be discharged by the Piscataway Plant may not be as high as that ② discharged by other area plants. Further, it is not clear what the thirty (30) day effluent limits will be for the Piscataway Plant. These must be established as required by the National Pollutant Discharge Elimination System.

The basis for our concern is shown in the chart below, which presents a comparison of pertinent effluent limits.

	Effluent Limits for any 30 Day Period (mg/1)		Proposed Effluent Limits for Piscataway (page 103)
Pollutant	Blue Plains	Virginia Plants	90% of the Time
BOD_5	5	3	10
P	.2	.2	.3
N	2.4	2 to 3	5
SS	7*	1	Not Specified

* Under Review, May be Lowered

Further, it should be pointed out that if the effluent is discharged into the Potomac Estuary rather than into the Piscataway Bay, a significantly lower degree of treatment may satisfy water quality criteria (maximum allowable pollutant loadings). However, exportation of effluent discharges does not solve existing water quality problems. This procedure should not be endorsed as a substitute for high-level wastewater treatment. ③

In conclusion, the State Water Control Board feels that before consideration can be given to other aspects of the project, the proposed effluent limits must be more clearly defined. We recommend that the effluent limits for the Piscataway Plant be no greater than those specified for any thirty (30) day period for the District of Columbia's Blue Plains Plant and the Virginia plants now under construction. ④

The Department of Health favors the project but notes that there are several errors in the appendix with regard to waste discharges to the Potomac River and its tributaries from Virginia facilities. They also note several typographical and spelling errors throughout the report, and that the proposed facilities do not include activated carbon adsorption in the treatment process although the discharge must meet the same standards as plants located in Virginia which have been required to install activated carbon adsorption facilities. If a more detailed report on the discrepancies noted in the appendixes or discussion of the activated carbon question is available, please advise the Bureau of Sanitary Engineering. ⑤

The proposed outfall for this project is located approximately 44 miles upstream of Upper Machodoc Creek, a tributary to the Potomac River and also the nearest of Virginia's productive shellfish growing areas. A buffer zone of this great size allows dilution and tidal factors ample time to reduce to an absolute minimum any hazards which the construction or operation of this facility might have for the shellfish growing waters of the Virginia tributaries to the Potomac River. ⑥

It should also be pointed out that all Virginia tributaries of the Potomac River between Mathias Point and Alexandria are classified as condemned shellfish growing areas. They are also non-productive as far as the shellfish industry is concerned. Hence approval of this project would have no effect on these areas.

The Marine Resources Commission has no comment on the draft statement itself. However, they would like to comment regarding the proposed fill in the Dyke Marsh Area. (According to Section 62.1-3, Code of Virginia, any encroachment on state-bottom in this area will require a Marine Resources permit). As of this date they have not received sufficient information to properly evaluate this portion of the project. ⑦

The Virginia Institute of Marine Science feels that the discussion of why such levels of treatment are necessary is inadequate. This is particularly true in the discussion of effluent disposal beginning on page 94. What are the natural loadings from freshwater inflow or those on the incoming tide from the Potomac? What will the loadings be from the Potomac once its loads are reduced by other treatment measures? Does the placement of the outfall in the Potomac ensure that the loads introduced there will not travel back up the Piscataway on the incoming tide? ⑧

The Virginia Institute of Marine Science indicates that these questions should be addressed before the expense of an outfall to the Potomac can be justified.

The Department of Agriculture and Commerce is interested in III D of the draft environmental impact statement which analyzes land treatment as an alternative to the proposed project. They advocate such an approach be considered for both sludge and effluent disposal on a decentralized basis in lieu of large regional treatment plants per se. ⑨

The Department of Agriculture and Commerce comments that they are not in a position to analyze and evaluate such an alternative; however, they do feel that it offers a real potential for enhancing the productivity of the remaining crop land in Northern Virginia and also a means of keeping it in production and retaining it as open space.

As experience and additional information is developed on land treatment of municipal waste, it is anticipated that the risks and disadvantages will be greatly reduced. In the III D alternative, the cost of land acquisition is suggested as the primary inhibiting factor; however, if the risks could be adequately minimized, it is highly likely that sufficient crop land could be acquired by lease arrangements or through easement agreements if such land could continue to be cultivated by present operators. In fact, there may be potential for acquiring land through "open space" easements with the "forgiveness" of taxes being sufficient compensation.

Utilizing and enhancing the productivity of our remaining crop land is essential to adequate production of food and fiber in the future. If municipal waste disposal can contribute to this important need, the country would be able to convert a great environmental problem into an environmental asset.

In view of the aforegoing, they would like to see the Environmental Protection Agency and the Washington Suburban Sanitary Commission explore further decentralized land disposal as a viable alternative to other methods of upgrading and expanding their wastewater treatment facilities.

They add that further development of land as a means of disposing of human waste enhances the opportunity to improve the present practices of disposing of animal wastes. The sophistication necessary for disposal of human waste and in some areas where large dairies adjoin urbanized areas, the two efforts might well be integrated.

Thank you for the opportunity to comment.

Sincerely,

Gerald P McCarthy

Gerald P. McCarthy
Executive Director

GPM:dls
cc: The Honorable Mills E. Godwin, Jr.
Mr. Charles Burbach
Mr. Oscar H. Adams
Mr. S. M. Rogers
Mr. S. Mason Carbaugh
Mr. J. L. Hamrick

222-OP-74

COMMONWEALTH OF VIRGINIA

STATE AIR POLLUTION CONTROL BOARD
ROOM 1106, NINTH STREET STATE OFFICE BUILDING
RICHMOND, VIRGINIA 23219
TELEPHONE (804) 770-2378

PAUL E. WILKINS
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ROBERT B. DELANO
Warsaw
ELIZABETH H. HASKELL
Martinsville
AXEL T. MATTSON
Yorktown

March 13, 1974

Mr. Daniel J. Snyder, Regional Administrator
Environmental Protection Agency
Region III
Curtis Building
6th and Walnut Streets
Philadelphia, PA 19106

Dear Mr. Snyder:

The figures presented in the EIS on the expansion and upgrading of the Piscataway Facility indicate that it will be in agreement with Virginia regulations. Therefore we have no objection to the proposed changes.

Sincerely,

John M. Daniel Jr.

John M. Daniel, Jr., P. E.
Assistant Executive Director - Enforcement

JMD/WPP/nep

cc: Region VII
Susan T. Wilburn

MEMORANDUM

State Water Control Board

2111 North Hamilton Street P. O. Box 11143 Richmond, VA. 23230

SUBJECT: Comments on EIS, Proposed Project for Addition of AWT to the Existing 30 MGD Capacity Secondary Treatment Facility at Piscataway, and for Installation of approximately 18,000 Feet of 108-inch Outfall Pipe

TO: KATHLEEN I. TAIMI, Bureau of Enforcement

FROM: T. M. SCHWARBERG, JR., Regional Director, NRO T. M. Schwarberg Jr.

DATE: April 12, 1974

COPIES: N. M. Cole

The overriding concern of the SWCB in connection with the subject project is the quality of the effluent in relationship to the other discharges in the Potomac River and its embayments in the Metropolitan Washington area and downstream therefrom.

The basis for our concern is shown in the chart below, which presents a comparison of pertinent effluent limits.

Pollutant	Effluent limits - for any 30-day period (mg/l)		Proposed Effluent Limits for Piscataway (page 103) 90% of the Time
	Blue Plains	Virginia Plants	
BOD_5	5	3	10
P	.2	.2	.3
N	2.4	2 to 3	5
SS	7*	1	not specified

* Under Review, May be Lowered

From the effluent limits listed above, it is not clear if the quality of the proposed Piscataway Plant effluent is as good as the Blue Plains Plant and Virginia plants now under construction. Further, it is not clear what the thirty (30) day limits are for the Piscataway Plant. These should be established for the required National Pollutant Discharge Elimination Permit.

Further, it is felt that available funds might be better spent by providing the degree of treatment which would solve the discharge problem in the embayment rather than exporting the discharge into the Potomac River. As a matter of fact, this may be in violation of the intent of P. L. 92-500.

In any event, we recommend that the effluent limits for the Piscataway Plant be no greater than those specified for any thirty (30) day period for the District of Columbia's Blue Plains Plant and the Virginia plants now under construction.

The draft of the EIS on the subject project is being returned herewith.

TMS/nf

Response: Virginia State Agencies

①

The proposed upgrading and expansion of the Piscataway Wastewater Treatment Facility has been designed to meet the recommendations of the Potomac River Enforcement Conference.

②

The EIS has been revised to more clearly indicate the thirty (30) day effluent limits for the Piscataway facility.

③

The exportation of effluent discharges to avoid best practical treatment would not be permitted.

④

See above responses.

⑤

The EIS has been so revised.

⑥

This information has been added to the EIS.

⑦

As indicated in the Draft EIS, WSSC will have to obtain all necessary permits and conform to all requirements.

⑧

The EIS has been revised to reflect these concerns.

⑨

EPA agrees entirely with the Departments of Agriculture and Commerce concerning the encouragement of land treatment and disposal of human wastes, if existing environmental conditions are conducive. This section of the EIS has been revised, subsequent to further studies, to indicate that the soils in southern Prince George's County are not generally conducive to land treatment of wastewater. Also, WSSC has developed a contingency plan which utilizes land spreading of digested sludge in the event the incinerators are found to be a possible public health hazard.

EPA does encourage and is requiring all applicants for future wastewater treatment grant funds to thoroughly evaluate land treatment and disposal of human wastes. It is also felt that with proper study and operating experience, the advantages of this method of wastewater treatment and disposal will be found to greatly outweigh its disadvantages under proper environmental conditions.

LOCAL GOVERNMENTAL AGENCIES

Office of the Montgomery County Executive and County Council

Prince George's County, Md. Department of Public Health

The Maryland-National Capital Park and Planning Commission

National Capital Planning Commission

The Mayor and Town Council of Forest Heights, Maryland

MONTGOMERY COUNTY, MARYLAND
COUNTY OFFICE BUILDING, ROCKVILLE, MARYLAND 20850

March 7, 1974

Mr. Daniel J. Snyder, III
Regional Administrator
United States Environmental Protection
  Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

The County has reviewed the Draft Environmental Impact Statement dated December 28, 1973, concerning the upgrading and expansion of the WSSC Piscataway plant to a 30 mgd Advanced Wastewater Treatment Facility (AWT). The Montgomery County Government submits the following comments on the project for inclusion in the record of the public hearing of March 7, 1974:

1. Montgomery County fully supports the immediate expansion and upgrading of the Piscataway treatment plant to a 30 mgd AWT facility. The County is cooperating with the other local jurisdictions in the metropolitan region and with the States of Maryland and Virginia in efforts to reduce the pollution of the Potomac River and its tributaries. The Piscataway project is a vital element to this regional wastewater management plan.

2. The County also endorses the further expansion of the Piscataway facility to an AWT capacity of 95 mgd at an early date. Montgomery County is proceeding with its plans for a major wastewater treatment facility at Dickerson consistent with the draft Potomac Metropolitan Area Basin Water Quality Management Plan. Successful and cost-effective projected wastewater flow management over the next several decades is dependent upon the expansion of Piscataway as well as construction of the Montgomery County AWT Plant.

3. The immediate construction of the proposed outfall line from the Piscataway plant into the main stream of the Potomac is specifically endorsed as a part of the Piscataway

expansion to 30 mgd and as a logical part of the long range wastewater needs for the Region.

Sincerely,

James P. Gleason
County Executive

Neal Potter
Neal Potter
Council President

JPG/NP:mmg

cc: Dr. Floyd D. Peterson
Mr. Francis B. Francois
Mr. William W. Gullett

DEPARTMENT OF HEALTH
PRINCE GEORGE'S COUNTY, CHEVERLY, MARYLAND 20785
(301) 773-1400

OFFICE OF THE
HEALTH OFFICER

March 15, 1974

Mr. Daniel J. Snyder III
Regional Administrator
U.S. Environmental Protection Agency
Region III
6th & Walnut Streets,
Philadelphia, Pa. 19106

Re: Draft Environmental Impact Statement
Washington Suburban Sanitary Commission
Piscataway Waste Water Treatment Facility

Dear Mr. Snyder:

On March 7, 1974, a Public Hearing was held in Oxon Hill, Maryland in reference to the above subject. Our Division received the document too late to prepare a presentation for that time so we are now submitting the following comments for the record. We address our comments to the Appendicies A, B, and C, which assess the impact of sludge incineration at this facility.

With respect to the following expected emissions from the sludge incinerators, nitrogen oxides, carbon monoxides, odors and visible emissions, the calculations appear adequate. The sulfur oxide emissions were based on the use of No. 2 oil as auxiliary fuel, but due to the current shortage of distillate fuel oils, it may be necessary to use residual oil as the auxiliary fuel. Residual fuel-oil has a sulfur content of 1.0% as opposed to the 0.3% for No. 2 oil upon which the calculations were based. It seems appropriate to base calculations on the highest sulfur fuel which may be used at the plant. ①

The prediction of the incinerator's effect of ambient concentrations of trace elements in the surrounding community is a more difficult task. Calculations for ambient mercury levels were based on sludge samples obtained on August 8 and 9, 1973, which indicated a maximum mercury concentration of 1.55 ppm (dry weight basis). Samples from two days is certainly not representative of annual conditions and more data is needed. A recent sample obtained on February 7, 1974 and analyzed by the Maryland State Health Department found a mercury concentration of 3.88 ppm (dry weight basis). ②

In the April 6, 1973 Federal Register, the Environmental Protection Agency set emission standards for the emission of mercury from mercury processing plants at 2300 grams per day. The emission standard was based on an ambient concentration of 1 microgram per cubic meter. Calculations should be based on expected ambient levels of mercury instead of the emission standard for mercury processing facilities. ③

Appendix B of the E.I.S. describes the diffusion analysis used to predict the ambient concentrations of lead and mercury in the surrounding area. The Climatological Dispersion Model determines long-term pollutant concentrations from the frequency of meteorological variables. The use of such a model may have to be modified due to the unique topography of the Piscataway area. The sludge incinerators are located on a plain practically at sea level, with elevations of 200 feet found within a mile of the facility. Much of the surrounding area is densely covered with trees which will modify the predicted dispersion of the plume. We recommend that the results from the C.D.M., Figures 1 through 4, be taken lightly and that instead of predicting annual concentration averages, the maximum levels that may be expected at nearby receptors be predicted using worst case meteorology. ④

Standards have not yet been set for the concentration of lead in the atmosphere. Lead emissions from the incinerator were found quite high at 26 lb./day. Until more information regarding the effects of ambient lead is available, this completion of this section of the E.I.S. should be postponed. ⑤

The Washington Suburban Sanitary Commission has contracted Batelle Institute to perform a comprehensive test program on the sludge incinerators. In cooperation with the University of Maryland, Batelle will sample stack emissions and trace the plume to determine resulting ambient concentrations of pollutants. The results of this study will yield information superior to any dispersion model predictions. For this reason we recommend that the publishing of the final E.I.S. be postponed until this study has been completed.

I hope that through the Batelle-University of Maryland Studies and full citizen participation, we can truly develop a comprehensive analysis of the impacts of expansion of its Piscataway Waste Water treatment facility.

Very truly yours,

Perry Stearns, MD

Perry Stearns, M.D.
County Health Officer

PS:JWK/lp

Response: Prince George's County Health Department

①

Present Maryland regulations for Area IV (Montgomery and Prince George's Counties) new incinerators require 0.3 percent or less sulfur content, by weight. Of course, if fuel availability makes higher sulfur content auxiliary fuel mandatory for operation, state regulations would need revision (or waiver) and SO_x emissions would increase proportionately. See response #3 to NCPC.

②

The expanded testing program will not rely on the August, 1973 sludge sample for Hg concentration.

③

The EPA standard for Hg emissions from stationary sources (2300 grams/day) does not apply to sludge incinerators. Separate Hg standards for sludge incinerators may be promulgated in the near future. Appendix B indicates Hg concentrations will not be high. Further testing will provide for more definitive conclusions.

④

For some pollutants (e.g., lead and mercury) it is the long term average levels which determine effects on public health. Results of the Climatological Dispersion Model, when more accurate emission factors are determined by the testing program, will be reasonably accurate.

⑤

A supplement to this EIS will contain the results of the Battelle-Columbus Laboratories and University of Maryland studies. Preliminary testing during January through March, 1974 has shown that much less than 26 pounds/day of lead are emitted. See Appendix A.

THE MARYLAND - NATIONAL CAPITAL PARK AND PLANNING COMMISSION
REGIONAL AND METROPOLITAN DISTRICTS IN MONTGOMERY AND PRINCE GEORGE'S COUNTIES, MARYLAND

Regional Headquarters Building
6600 Kenilworth Avenue
Riverdale, Maryland 20840

277-2200
Area Code 301

PL-PG-20

March 18, 1974

Mr. Robert J. Blanco, P.E.
Chief, Environmental Impact Branch
United States Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

Re: Draft EIS (3-OGC-IS-M-1)

The Prince George's County Planning Board urges immediate approval of the Draft Environmental Impact Statement for the Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 mgd AWT. In Urging immediate approval of the Draft EIS as a whole, we would like to emphasize the importance of the 108" outfall line to the Potomac River Estuary in conjunction with the 30 mgd AWT addition. Both projects are vital to County and State development policies and programs for the Potomac River Basin since the full 30 mgd AWT capacity can only be used if the outfall line to the mainstem of the Potomac River is also constructed.

Although we urge immediate approval of these important projects, we do have some reservations about the proposed methods of sludge processing. In view of air quality and energy constraints, we do not feel that it is wise to become locked into a program of incineration.

In reference to air quality we refer to a statement on page 132 of the Draft EIS which states that, "Rather high levels of lead and mercury would occur very close to the plant." If the treatment plant is eventually expanded to 95 mgd as programmed by the County and State and sludge incineration is also expanded, the potential for serious air quality deterioration will also increase. ①

Another aspect of sludge incineration which should be examined further is the use of #2 Fuel Oil in the incineration process. Reference is made to page 142 of the Draft EIS which states that each incinerator will consume approximately 60 gallons of #2 Fuel Oil per hour. With two incinerators operating constantly, the total amount of fuel required per year would be approximately 1,051,200 gallons or enough fuel to heat approximately 700 homes for a year. In view of the present energy "crises" all possible alternatives to sludge incineration should be considered. The economics of various processes should be reevaluated in view of the energy problem and a contingency plan should be developed as suggested on page 147 of the Draft EIS. Hopefully WSSC will take the lead in research toward developing sludge processing methods which utilize the energy content of the sludge. Our goal should be the recycling of the sludge for beneficial uses to the extent practical. ②

Again I would like to emphasize our recommendation for immediate approval of the Draft EIS for the 30 mgd AWT facility at Piscataway and the 108" outfall line to the Potomac Estuary. Although we have certain reservations concerning sludge incineration in view of air quality constraints and the energy "crises", these reservations should not delay approval of these much needed projects.

Very truly yours,

Philip R. Hogue

Philip R. Hogue
Chairman

PRH:cmc

Response: Maryland-National Capital Park and
Planning Commission

①

It is true that expansion of incineration to dispose of all sludge from an expanded treatment plant would increase emissions proportionately (assuming control technology is not improved). Such expansion, if eventually proposed by WSSC for EPA funding, will require a new NEPA review,and NPDES permit for the increased effluent.

②

A contingency plan for sludge disposal has been developed by WSSC and is discussed in Section II and described in Appendix K. This alternative will be used until completion of the incineration testing program and thereafter if EPA is not convinced that operation of the incinerator will be safe. See #3 response to NCPC regarding the fuel situation.

NATIONAL CAPITAL PLANNING COMMISSION

WASHINGTON, D.C. 20576

NCPC File Nos. 0735 & 1200 APR 4 1974

Mr. Robert J. Blanco, P. E. Chief
Environmental Impact Branch
U. S. Environmental Protection Agency, Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Re: Draft Environmental Impact Statement, Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 MGD AWT

Dear Mr. Blanco:

We appreciate the opportunity to comment on the Draft Environmental Impact Statement for Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 MGD AWT, which has been transmitted to the Commission for review and comment.

The proposed expansion and upgrading of the Piscataway Wastewater Treatment Plant is consistent with the Commission's previous recommendations and comments on regional water quality and wastewater treatment needs. In its reports on the Metropolitan Washington Council of Governments' 1970 and 1972-73 Water and Sewer Plans and Programs (see attached), the Commission stated that greater emphasis should be given to the critical shortage in capacity in the region's sewerage treatment facilities, and urged expediency in acquiring and maintaining adequate levels of effluent treatment and the abatement of pollution in the Potomac and other water courses. More specifically, the Commission supported the need to expand and upgrade the Piscataway Wastewater Treatment Plant as part of WSSC's provision for additional sewage treatment capacity within the region's wastewater management system.

On the basis of a staff review and analysis of the Draft Environmental Impact Statement, we offer the following comments for consideration and clarification in the preparation of the Final Environmental Impact Statement:

Section II. F. Aesthetics, Recreation and History

Page 58 and Appendix J state that the lands surrounding Piscataway Bay are considered one of the most important sources of archeological material for the pre-history of the Middle Atlantic Area. ①

More specifically, Piscataway Park has been placed on the National Register of Historic Places as a National Historic Landmark by the Department of the Interior, as follows:

*ACCOKEEK CREEK SITE (see Charles County)

ACCOKEEK VICINITY, PISCATAWAY PARK
Piscataway Park (incorporating Accokeek Creek Site), across the Potomac from Mount Vernon (also in Prince Georges County).

The asterisk indicates National Historic Landmark status as designated by the Secretary of the Interior.

Fort Washington is also listed in the National Register, but is north of Piscataway Creek and does not seem to be affected by the undertaking for the wastewater treatment facility. However, it as well as Mount Vernon and Piscataway Park should be correctly noted in the Final Statement as National Register Landmarks.

Section IV. A. Detailed Description of the Proposed Upgrading & Expansion

1. Page 111 indicates that land clearance for materials storage and the preparation of access roads would precede excavation and installation of the 108" conduit for transporting treated effluent to the main channel of the Potomac. The Final Statement should provide additional information concerning the size and placing of such storage areas and access roads, especially those placed on Federal lands, including evaluation of any potentials for increased runoff, erosion, and ground water changes or problems and the measures which will be taken to mitigate them. ②

2. On Page 115 the Statement indicates that the sludge incinerators are designed to operate at a temperature of approximately 1400°F., with the sludge supplying approximately half of the heat required to support combustion at this temperature and fuel oil supplying the rest. In view of the shortage of fuel oil and the potential for future expansion of the Piscataway Facility, the possibility of recycling any additional heat generated by effluent processing in addition to utilizing the sludge, should be addressed. If possible, the Final Statement should include a discussion of additional energy conservation techniques which could be incorporated into the Piscataway Facility operation (i.e., conservation and recycling of water needed in plant operations, etc.). ③

Also, in view of the recommendation in this Draft that WSSC develop a "contingency plan" for alternative methods of sludge treatment and disposal if #2 fuel oil becomes unavailable, the Final should indicate the status of fuel availability.

Section IV. B. Environmental Impact of the Proposed Action

1. Page 124 states that the major impact of the conduit would be encountered in the wooded areas since land must be cleared for a 40 to 50 foot width. However, the Draft indicates that it may be possible to preserve the larger trees beyond 15 feet on either side of the conduit's center line. Additional consideration should be given in the Final to preserving as many of the larger trees as possible beyond the 15 foot center line, so as to minimize the visual and aesthetic impact of the excavated area, and to help maintain the natural character of the surrounding area. ④

2. Page 126 states that the dredged material from the construction of the outfall line in the Potomac will be disposed of at Dyke Marsh, to aid in its restoration. However, the WAPORA report, included in Appendix K, states that the National Park Service, which is responsible for reclaiming the Dyke Marsh area, will be unable to have the Marsh prepared to receive dredge spoil in time for construction of the transport conduit. In view of this situation WSSC would be prepared to remove the dredge spoils to outside disposal areas and/or alter construction methods to vary the quantity and quality of the spoils. The Final Statement should clarify whether the Dyke Marsh disposal alternative remains feasible and include additional information on other dredge disposal sites, as well as the impacts which alterations of construction methods might have on water quality and the adjoining lands, if these alternatives are selected. ⑤

3. Page 126 also states that the impact of the effluent discharge on the tidal marshes along the shore of Piscataway Park is difficult to predict. The Statement notes that effluent concentration may generally occur around Mockley Point and extend one-third of a mile into Piscataway Bay. Given the fact that discharged effluent will increase as the facility expands, the Final Statement should discuss what consideration has or will be given to extending the conduit discharge point further down the Potomac to avoid ⑥

or lessen the potential impacts on the Park's shoreline. If a conduit extension in the river is considered, any additional effects which it might have on aquatic life, water quality and the aesthetic character of the riverfront, should also be addressed.

4. The discussion on pages 135-136 concerning military Family Housing should be updated to indicate that the DOD has 1) revised its plans for military family housing to provide for only 1,350 additional units in Prince Georges County, or about 25% of its new units in the National Capital Region, rather than the 45% or 3,170 units previously proposed, and 2) signed an agreement with the Prince Georges County officials to this effect on March 7, 1974. ⑦

5. Although pages 136 and 137 contain a brief discussion of the potential impact on aesthetics and archeology and the steps to be taken to mitigate them, there is no specific identification of registered landmarks within the area of the proposed action (as noted previously), or an indication that a determination of the nature of any impacts on such listed or eligible landmarks has been made, in consultation with the Maryland and Virginia Historic Preservation officers. The status of procedural compliance with Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593 should be addressed in the Final Statement, as indicated in the Advisory Council on Historic Preservation's "Procedures for the Protection of Historic and Cultural Properties", published in the Federal Register on January 25, 1974. ⑧ In addition, the Final Statement should more specifically indicate that future expansion of the AWT capacity from 30 MGD to 96 MGD will be planned and undertaken so as not to adversely affect the character and quality of the shoreline scenic easement, through which the proposed Potomac Heritage National Scenic Trail will pass. ⑨

Section IV. C. Adverse Impacts Which Cannot be Avoided

1. This section recognizes the potential noise and safety aspects of conduit construction on the area's residents. The Final Statement should include those measures which will be taken during the 8-10 month construction period to mitigate such impacts. ⑩

2. The results of the diffusion analysis for mercury and lead emissions as a result of the incinerator operation indicate ⑪

> rather high levels close to the plant. Appendix B further indicates that high lead levels in the immediate vicinity of the plant can be expected at certain times because the incinerator stacks are the same height as the roof peak of the building, leading to ineffective dispersion. In view of these preliminary findings and the recent issues which have been raised concerning elevated lead levels in some residents of the surrounding area, the Final Statement should indicate to what extent, if known, such potential levels might affect nearby residents and plant employees, and whether further consideration will be given to the potential dispersion problem.

We appreciate the opportunity to comment on this Draft Environmental Impact Statement, and hope that our comments will be of some assistance in the preparation of the Final. We look forward to receipt of the Final Statement.

Sincerely yours,

Charles H Conrad

Charles H. Conrad
Executive Director

Attachment

Response: National Capital Planning Commission

①

The EIS has been revised to specifically identify the status of the historic sites and landmarks in the Piscataway area. In addition, as indicated in Section IV, full compliance with Section 106 of the National Historic Preservation Act has been accomplished.

②

Section IV.A.1.b. of the EIS has been revised to indicate that the 50 foot right-of-way for the location of the effluent pipe would also serve as the access road and materials storage during construction. In addition, the requirements of the WSSC "Sediment Control Permit for Utility Construction" have been added to this Section and the "Environmental Specifications" have been added in Appendix K.

Section IV.B.1 of the Draft EIS stated that erosion as a result of construction of the effluent pipe is expected to be minor since most of the fields traversed by the pipe are flat and are not prone to erosion. In addition, the predominant vegetation is composed of annual grasses or crops which can be replanted or would reseed themselves within a short period of time, thus preventing any excessive erosion.

③

Operation of the existing and proposed effluent processing facility will not generate significant heat energy adequate for recycling.

All industrial-type water necessary for operation of the wastewater treatment facilities will be reclaimed from the chlorine contact chambers.

In consultation with the Regional Energy Office, the present status of #2 fuel oil availability is good.

In fact, there now exists an over supply of this source of fuel. However, this by no means indicates that the same situation will prevail for the life of the project. The general consensus is just the contrary, in that the United States, along with other major world powers, are using non-renewable fuels at an alarming rate and that unless there is a shift to more efficient means of energy sources, oil supplies will become critical. It is felt that during the transition period of converting to more efficient energy sources and usage, a sufficient supply of #2 fuel oil for the Piscataway incinerators (30 mgd) will be available.

④

The National Park Service will stipulate in its permit that every effort will be made to protect as many trees as possible within the 50 foot right-of-way. Through this effort, the construction scar will not be as noticeable due to the elimination of the traditional right-of-way swath. The effect should then be one of a more natural tree line along the right-of-way. See Appendix K, WSSC's Environmental Specifications.

⑤

At the present time, Dyke Marsh remains a feasible alternative and is still intended to be utilized for spoils disposal.

⑥

This section of the EIS has been expanded to reflect this concern.

⑦

The EIS has been revised to reflect the current agreement between DOD and the County.

⑧

Figure 6 indicates the location of all registered landmarks. Consultation with the Advisory Council, State Historic Preservation Officer, and National Park Service has been done. See their correspondence in Appendix J.

⑨

EPA coordinates all such proposals with National Capital Parks of the National Park Service.

⑩

This Section has been so revised.

⑪

The initial fear that a large number of nearby children had elevated blood lead levels was alleviated by subsequent testing by the County Health Department. Preliminary stack tests have shown that the incinerator will not significantly elevate the amount of ingestible lead. Additional testing will provide for more definitive conclusions.

OFFICE OF
THE MAYOR AND TOWN COUNCIL
FOREST HEIGHTS, MARYLAND
20021

April 6, 1974

Mr. R. Blanco
Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

In response to the Piscataway Environmental Impact Statement, I wish to express the concern of the residents of the Town of Forest Heights as to the technical accuracy and the many deficiencies of the statement. The Town of Forest Heights is located approximately 7 miles from the Piscataway Plant and approximately one mile from the Blue Plains Sewage Treatment Plant. Being physically close to Blue Plains and having sludge dumped next to our town, we are aware of the problems and odors connected with sewage treatment and sludge handling. The remarks on the Piscataway EIS also pertain to the Blue Plains EIS as both statements are incomplete or inadequate in many overlapping areas.

① The residents of Forest Heights are users and neighbors of the sewage system and have a sincere interest in its working efficiency. Careful planning should not be neglected for what might be a quick solution to the sludge disposal problem. Irreversible commitments, especially with regard to the sludge incinerator system, should not take place until a pilot system has been carefully studied and data on its operation documented. What is initially stated as a negligible effect on the ambient air quality from sludge incineration is found to be a very serious health and pollution problem after reading the published information on existing systems.

② The Piscataway and Blue Plains Environmental Impact Statements are in severe need of editing and data documentation. There are many technically misleading statements, e.g., the 1-3% average increase in the pollution level from the Blue Plains incinerators over 100 square miles is not valid as it is coming from a point source. Local increases in pollution, such as in Forest Heights or the Oxon Hill area, should be given. Noticeably absent in the incinerator discussions are details on: 1, scrubber efficiency with respect to particle size and the correlation of particle size with health aspects; 2, temperature inversion effects; 3, plume dynamics; 4, the health hazards of toxic metals, e.g., Hg, Be, Cd, Pd and As. It is requested that the sludge incineration aspects at Piscataway and Blue Plains be given serious technical attention. Also, it is requested that the areas above be addressed and added to the forthcoming impact statements on Piscataway and Blue Plains.

There are inconsistencies in the EPA's statement concerning sludge incineration. In the EPA publication No. PB211323, Sewage Sludge Incineration, it is stated on page 89 by Dr. Shy, Deputy Director, Division of Health Effects Research, concerning toxic metals that, "... are likely to represent a true health hazard, especially if sewage sludge incinerators proliferate in urban areas." Also, on page 56 of the same EPA report with regard to sludge incineration, "The chemistry of the potentially hazardous substances in sludge should be investigated by literature study and experimentation so that predictions can be made of their behavior upon incineration." Cited also are information needs to determine the fate of toxic metals, pesticides, and other hazardous materials.

③ In contrast to the above statements, without supporting scientific evidence or data documentation, it is stated on page 94 of the Piscataway EIS with regard to sludge incineration that, "In addition, it has proven to be a reliable process which can handle various types of sludges. All the other processes considered have not proven to be either reliable, economical, or able to treat various types of sludges." It is requested that scientific proof be presented to establish the validity of the above statements.

④ Another disturbing comment by the EPA was observed in the Fact Sheet on the Piscataway EIS distributed on March 7, 1974, at the Public Hearing at Oxon Hill, Maryland. Under Air Quality, page 2, it is stated, "Studies by EPA show no appreciable degradation to ambient air quality resulting from incinerators at Piscataway." In the same section, "Research into the range and toxicity of particulates and heavy metals is continuing at EPA." The health hazards should be established prior to stating that there is no degradation of air quality from incineration. Documented data is again needed so there will be a basis for EPA's credibility.

⑤ There are available reports, for example the EPA report No. 430/9-73-006, Survey of Facilities Using Land Application of Wastewater, on alternate systems for sludge disposal. Composting and land based systems have been successfully used. More attention should be given to such recycling methods, as opposed to incineration which is expensive and represents a health hazard. It is also important to consider the Vander Jagt amendment to the Federal Water Pollution Control Act in which is is stated that the ultimate disposal of sludge should be in a manner that will not result in environmental hazards. The recycling of waste is national policy.

⑥ In the Federal Code of Regulations (#40), the purpose and function of the EPA is defined. The Environmental Protection Agency was created to permit coordinated and effective governmental action to assure the protection of the environment by abating and controlling pollution on a systematic basis. The endorcement by the EPA of sludge incinerators while the health aspects have not been verified is not in keeping with its charter.

It is contradictory statements, such as those above concerning incinerators, that add to the increasing concern as to the accuracy and integrity of the EPA reports.

Acknowledgment of the receipt of this statement and its incorporation into the forthcoming Piscataway EIS would be greatly appreciated.

Sincerely,

James Comas

Dr. James Comas, Councilman

Please send reply to:

Forest Heights Community Center
108 Arapahoe Drive
Forest Heights, Maryland 20021

cc: Russell Train, Administrator
Environmental Protection Agency

Response: Mayor and Town Council, Forest Heights,
Maryland

①

The EIS has been revised to include all the data which is presently available on the operation of the Piscataway incinerators. The preliminary tests indicate that no public health hazard would result from the operation of the incinerators, therefore EPA has notified WSSC (see telegram App. K) that, based on these preliminary studies, it has no objections to the operation of the incinerators for testing purposes only. While continued analysis of the incinerators are being conducted by EPA, Battelle Columbus Laboratories, and the University of Maryland will conduct studies on the facility's emissions, as well as on ambient air quality in the Piscataway area. When these studies are completed, the results will be presented in a Supplement to the Final EIS. EPA will not allow the Piscataway incinerators to be routinely operated until we are convinced that they do not represent a hazard to the public health and welfare.

②

The EIS has been revised and updated to reflect these concerns as was indicated in the previous paragraph.

③

The EIS has been revised to indicate potential health dangers from sludge incinerator emissions.

④

The EIS has been revised to include supportive data for EPA's preliminary findings. The Fact Sheet was in error in that it did not indicate that the studies and findings were preliminary.

⑤

The EIS has been revised to include alternative means of sludge disposal and a contingency plan by WSSC for sludge handling and disposal, which will be implemented while the incinerators are being tested and a long range plan if the incinerators are found to be a possible health hazard. It should be noted that incineration is not a method of ultimate sludge disposal.

⑥

The Final EIS clearly states EPA's position concerning the Piscataway incinerators . At this time, EPA is convinced that the incinerators are safe to operate for the purpose of testing with no resultant danger to the public health.

CITIZENRY

Mr. John H. Buckingham, Jr. Manager, Netherwood Creek Wildlife Refuge

The Palisades Citizens Association

Mr. W. L. Callaway

Mr. Stuart G. Hibben

Lung Association of Southern Maryland, Inc.

Mr. David L. Wilt

Mr. James D. Spart, President, Piscataway Hills Citizens Association

Mr. Robert Ruskin, President, Alice Ferguson Foundation, Inc.

Ms. Jean Thompson

Dr. Gordon Wood Anderson

Ms. Nancy W. Ignatius, President, Concern, Inc.

Ms. Sharron S. Quisenberry

Mr. James L. Repace

Ms. Ulla Rudd

Mr. Benjamin R. Swann

Mr. James L. Repace, Chairman, Air Pollution Connittee, P. G. Environmental Coalition

National Trust for Historic Preservation

Mr. H. J. Rhodes

Mr. Harold A. Williams, President, Warburton Manor Citizens Association

Mr. and Mrs. Robert Nordstrom

Ms. Edna Henderson

Mr. and Mrs. Ronald E. Kngarise

Mrs. Gerald Fratantuono

Mrs. Sharon Wright

Ms. Erica G. Kenney, President, PTSA Eugene Burroughs Junior High School

Mr. Joseph J. Meder, President, Harmony Hall PTA

Mr. and Mrs. W. R. Buterbaugh

The National Association of Realtors

Mr. Charles G. Dalrymple

Mr. Jim B. Bock

Mr. Charles E. Campbell

NETHERWOOD CREEK WILDLIFE REFUGE
J. BUCKINGHAM, MANAGER
ROUTE 2, BOX 122
WALDORF, MARYLAND 20601

Tuesday, February 12th, 1974.

Mr. Daniel J. Snyder, III, Regional Administrator,
Region III, U. S. Envirmomental Protection Agency,
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

Thank you for your letter of February 5th, 1974, enclosing a copy of the Agency's environmental impact statement, relative to the upgrading and expansion of the WSSC Piscataway Wastewater Treatment Facility, and for your invitation to submit comments on the same.

First, I wish to commend your Agency for its asking for comments from interested, local people. I can only hope that greater attention will be given by you to such comments than have previously been given by the WSSC in connection with its projects.

One gets the feeling that the WSSC crowd holds public hearings only because it is required to by law, but that after the hearing has been duly held, according to its ritual, it merrily goes on its way, doing what it pleases in the way of such projects. I could give you many examples of this but will name only two. Last Fall, it put in a public waterline right by my place, without holding any public hearing at all. This was a 12 inch pipeline to serve a single residential customer. It also erected a huge, high-rise water tank, for future use smack in the middle of an Accokeek, Maryland residential community, despite vigorous protests of the people immediately affected, despite the availability of a vast area of undeveloped, open countryside in the immediate area. Someone even offered to donate the land if they would locate the tank away from this community of small, detached homes. But the WSSC in its customary obstinate manner, did exactly what it pleased, regardless of local sentiment. It thus took the first step in downgrading a residential zoning area into industrial. Not much help from the County Commfssioners who shed crocodile tears about it. So much for the intelligence of the political and policy people over at the WSSC.

① The same callous and stupid attitude is seen in the WSSC's present plan to run a huge effluent-disposal pipeline through private property at the Piscataway Wastewater Treatment (sewage) Plant, utilizing its legal power of condemnation in grabbing such private property. I could not agree more with the comment of the National Park Service, in its statement incorporated in your initial impact statement, dated Dec 21 1973, Appendix J Environmental Assessment) in its statement to your Agency, asking why could not the WSSC run its effluent pipeline under the shallow water of the Piscataway Bay, out to the middle of the Potomic River, since the present plant facility is actually located on the Bay shore?

Why, in heaven's name, disrupt all the people living in Calvert Manor, not to mention the wildlife in the area, for an indefinite time, involving all the hazards to human and animal and plant life now in place, with this enormous effluent pipeline? Then there is the probably future impact of an additional underground pipeline when the plant goes to its next volumetric stage, now envisioned to be some 90 million gallons per day, as the Washington metropolitan area continues its growth?

Evidently, WSSC is more concerned with the impact of its effluent pipeline on the fish in the Piscataway Bay, than it does with the people there, whose taxes practically cover its continuing operating expenses!

Since EPA is footing 75% of the cost of this project, and the taxpayers of Montgomery and Prince George's County, the rest (including the people who live in the piscataway-calvert manor areas, I feel that you can put your vast financial pressure on the WSSC to come up with an alternative plan to put in the effluent pipeline under the Piscataway Bay, and not through all the private homesites, and farm lands, now in place and prospectively to be erected along the beautiful Potomac River shore and parklands. While it may be said that the people there will be minimumly affected, this is not the answer. The aim should be to not affect them at all in a needless manner.

I would like to say, here and now, that this proposition is not based on any personal impact on my wildlife refuge or personal property, since I do not actually live or operate in the Piscataway Bay area. However, as a person very much interested in ecology, I do have a concern with it. From the viewpoint of common sense, economy, and environmental impact, I think that this alternative should be thoroughly explored by your Agency before granting any substantial sum to the WSSC.

Sincerely yours,

John H. Buckingham Jr

John H. Buckingham, Jr., Manager,
NETHERWOOD CREEK WILDLIFE REFUGE.

NETHERWOOD CREEK WILDLIFE REFUGE
J. BUCKINGHAM, MANAGER
ROUTE 2, BOX 122
WALDORF, MARYLAND 20601

Thursday, February 14th, 1974.

Mr. Daniel J. Snyder III, Regional Administrator,
Region III, U. S. Environmental Protection Agency,
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

In response to your letter of February 5th, 1973 to me, enclosing a copy of your Agency's Impact Statement regarding the Piscataway Wastewater Treatment facility, and its presently contemplated expansion and upgrading, I wish to submit for your consideration the following statement:

One of the great problems associated with projects of this nature of that of - sludge disposal. Much has been done in the way of wastewater disposal by engineers and sanitarians, but little, if anything, has been done to date with the problem of sludge disposal. In fact, this is one of thegreat local political problems with all sewage disposal plants, and particularly so with the Blue Plains Plant, which serves the great metropolitan area of our Nation's Capital. Likewise, Piscataway will be a first cousin to the Blue Plains Plant, since it will help take the load off of the now overloaded Blue Plains Plant.

While sewage sludge is generally looked upon as a necessary evil, because of its all-pervasive stench for miles around, as the wind listest, not to mention its potential and esthetic hazards, degrading impact on real estate values, and political impact on locations for such plants, I think that the time has come to effect a material change in this attitude toward and regard for sewage sludge. Actually, it could be looked upon as an economic assets, if properly handled, in the same terms that environmentalists have long regarded trash and garbage. After all is said and done, sludge is part and parcel of the food-chain cycle, and can be regarded as a valuable source for plant food, upon which we all depend. If you have even listened to the renowned local professor of ecology of American University, you could gain a great insite into the need for recycling our biological system. It would be a great movement forward if you could enlist the consultative services of Dr. Martha Segar, at American University, in connection with the environmental impact of the Piscataway Plant upgrading. While I do not know the renowned professor, personally, I frequently listen to her enlightening radio program on the local station WETA - public radio broadcasting.

I believe that you will find that Professor Segar is currently broadcasting a weekly series on the environment and ecology on television or radio station WAMU.

While it is apparently true, that your present efforts are directed to the matter of primary and advanced treatment of sewage, as such, and the financing of wastewater effluent disposal, as a means of helping to clean up the pollution of the Potomac River, yet, I think that your efforts should also include the matter of sludge disposal, even though that is a continuing operating problem, after the capital improvements have been financed.

② You see, if the sludge is not properly disposed of, there is the continuing danger that it will be dumped out-of-hand into the Potomac River. The same polutative hazard exists whenever the normal capacity of the treatment plant is exceeded, or an operational breakdown, or management breakdown occurs. What's to stop the operators, for example, from going on strike over a labor dispute, either in the operation of the plant, or the transporting away, of the sludge? Experience has shown that the Plant at Blue Plains has, in the pass, often bypassed the plant, and dumped sewage directly in the Potomac River basin. What's to stop the Piscataway plant from doing likewise?

So you see, the disposal of the solid waste material from a sewage treatment plant is equally as important a problem as the waste water disposal one.

③ It is suggested that the technology already exists for converting this sludge into a useful end-product, in the same manner that trash and garbage, old newspapers, and tincans and old automobile chasses are done, through - recycling.

It is reasonably certain that with all the vast research facilities of the Federal Government, not to mention all the colleges and universities interested in the subject of pollution, sewage sludge could also be recycled into a useful product, viz. as fertilizer, in some form or fashion.

The great problem with sewage solid waste material is that nobody, but nobody, wants it dumped in THEIR backyard. Most of it comes from the high-intensity or density residential areas and is dumped, for political reasons, in the backyard of the poorer people living in rural or outlying areas, where the people do not have the same political clout to keep it away from them.

With all the taxpayers money you are giving away in the Piscataway project for physical facilities and equipment, why could not your Agency put up a substantial prize for the discovery of a chemical process for the chemical and biodegradible deodorization of sewage sludge? I am sure that some hungry and knowledgable people would direct their attention to this matter if the price was right!

By mixing the semi-dry or fully dried sludge with an absorbent material, such as the abundantly available vermiculite sands of the Pope's Creek area of Southern Maryland, the odor of fecal waste material could be greatly eliminated. By promoting the fertilizer value of the product, it could be readily distributed to enterprising farmers, growers of sod, tobacco, hay, and even legumes. Surely you could enlist the resources of the Department of Agriculture in this ecological effort.

In this way, you could further promote your function of environmental protection of the Potomac River and convert a loss into a gain, or at least break even in accomplishing your total mission.

Why this has not been thought of before, I can only surmise. In this area, the calibre of local politicians is such that they can only do things in the most simplistic manner. To them, the sewage sludge is regarded as a highly desirable thing to dump in somebody else's backyard. None of them would ever dream that it could be an economically useful product. The most some of them have done is to use it as a land-fill, or spread it along the side of the parkways and in the media strip. Some use of it for lawn fertilizer has been made, but it seems that practically no one wants it for their lawn in its odoriferous, viz., untreated form, ... and you can hardly blame them. On the other hand, there is so much of this sludge available, that the space problem for storage and for dumping it becomes acute.

I think that the cost of sludge disposal should be examined in detail, incidential to your making this grant to the WSSC.

It is very possible that the vast tobacco, grain, and legume farms of Southern Maryland, Montgomery County, Maryland, Delaware, Virginia, and New Jersey, not to mention North and South Carolina, could readily utilize this sludge, as properly treated, merchandized, and distributed. Even if this operation was done merely at cost, or slightly below cost, it would be a gain, since a product, generally regarded as an uneconomic nuisance, could be turned into a ecologically useful product and process. Fertilizer, which has been removed from the soil, in the food chain, would, thus, be put back in the soil, from which it came.

You carefully-directed attention to this proposed idea is earnestly requested.

Sincerely,

John H. Buckingham Jr

John H. Buckingham, Manager,
NETHERWOOD CREEK WILDLIFE REFUGE.

(Kindly excuse lousy typing job, as this was done in a hurry so as not to miss your filing deadline.)

Reproduced from best available copy.

NETHERWOOD CREEK WILDLIFE REFUGE
J. BUCKINGHAM, MANAGER
ROUTE 2, BOX 122
WALDORF, MARYLAND 20601

Tursday, February 2[illegible]th, 1974

Mr. Daniel J. Snyder III, Regional Administrator,
Region III, U. S. Environmental Protection Agency,
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

On February 14th, 1974 I wrote to you in regard to the Agency's Impact Statement regarding the Piscataway Wastewater Treatment facility, at Piscataway, Maryland, and in particuler regard to the problem of - sludge disposal.

Apropos to my previous letter, I am enclosing page 1 of the February 27, 1974 issue of the Citizen News (a Charles County newspaper), which illustrates exactly what the various attitudes toward sewage sludge are in terms of the reaction of public officials to the dumping of it in their jurisdictions, and the reaction to one farmer, who is using this solid waste for its fertilizer value.

You may note that this paper carries two stories on its aforementioned page 1 articles, highlighting the divergent views toward the matter of sludge disposal.

If there were more farmers like Frank Robinson, of Benedict Maryland, the problem of sludge disposal would be resolved.

Of course, the sheriff also had a point, in that he doesn't want the pollution problems of the Potomac River (in Prince George's County, Maryland) dumped on him and the Putuxent River (in Charles County, Maryland).

You may be interested in following up on this case in the Charles County Courthouse.

Very truly yours,

John H. Buckingham Jr.
John H. Buckingham, Jr., Manager
NETHERWOOD CREEK WILDLIFE REFUGE.

Encl.

NETHERWOOD CREEK WILDLIFE REFUGE
J. BUCKINGHAM, MANAGER
ROUTE 2, BOX 122
WALDORF, MARYLAND 20601

March 4th, 1974

Mr. Daniel J. Snyder, III, Regional Administrator,
Region III, U. S. Environmental Protection Agency,
Philadelphia, Pennsylvania 19106

Dear Administrator Snyder:

Subject: Piscataway (Maryland) Wastewater Treatment
. facility - and Agency's Impact Statement

The enclosed newspaper clipping from the Friday, March 1st, 1974 issue of the Washington Star-News, may be of interest to you in your further consideration of the environmental impact of the Piscataway Wastewater Treatment Plant enlargement and upgrading, with Federal Funds administered or approved by your Agency.

Illustrated here, is the potential health and esthetic point of view of individuals and groups affected by the unfavorable and possibly harmful odors eminating from the sewage treatment plant and its ever-present sewage sludge deposits.

As I wrote you on February 14th and 28th, 1974 on this matter, it is one which your Agency might well feel, deserves its careful attention.

It is my opinion that much of the problem arised from the sludge accumulations at or near the treatment plant. If, in some way, this sludge could be promptly removed from the area where it is most objectionable, and possibly hauled away to distant farm and open lands, far from the human environment, the problem would be largely resolved.

As you were previously advised, some effort on your part, toward deodorizing this sludge, would go a long way in eliminating protests, such as are evidenced in the attached newspaper article.

As you may note, while the attached article relates to the Plant at Blue Plains, D. C., the same impact will necessarily attach to the operations at the Piscataway Plant.

Very truly yours,

John H. Buckingham Jr.

John H. Buckingham, Jr., Manager,
NETHERWOOD CREEK WILDLIFE REFUGE.

Encl.

NETHERWOOD CREEK WILDLIFE REFUGE
J. BUCKINGHAM, MANAGER
ROUTE 2, BOX 122
WALDORF, MARYLAND 20601

Friday, March 8th, 1974

Mr. Daniel J. Snyder III, Regional Administrator,
Region III, U. S. Environmental Protection Agency,
Philadelphia, Pennsylvania 19106

Subject: Piscataway (Maryland) Wastewater Treatment Facility - and your Agency's Impact Statement relative thereto.

Dear Administrator:

Enclosed herewith is another statement (in the form of a letter-to-the-Editor, contained in the (Wednesday, March 6th, 1974 issue of the) Citizen News, a weekly newspaper located at LaPlata (Charles County), Maryland.

This informative letter by a Mr. Henri I. E. Schaepman, a resident of La Plata, Maryland, an employee of the National Academy of Sciences of Washington, D. C., a horticulturist, an owner of his own nursery, and a representative of the Stark Brothers Nurseries, is on the pertinent subject of: Sewage Sludge, Mess or Asset? Mr. Schaepman's letter is self-explanatory. He is concerned, as an environmentalist, with theproblem of sewage disposal. While he is not personally known to me, it appears that his thinking parallel's that of mine in my initial letter to you of Thursday, February 14th, 1974, regarding the same problem at the Piscataway Wastewater Treatment Facility, to which you have directed your Environmental Impact Statement, mailed on February 5th, 1974, and inviting comments within 45 calendar days from that date. I trust that this referral meets your stated deadline.

Kindly consider this referral in your revised impact statement on the Piscataway project, along with my previous referrals of February 12, February 28th, and March 4th.

As you can see this matter of sewage sludge disposal is a very live one down in this end of Prince George's County, and in upper Charles County.

You may note that Prince George County planners are proposing to permit construction of a satellite city down here along the Mattawoman Creek, with a projection of some 375,000 population by 1995, and developers are already getting on line to get their plans on the zoning drawing boards. The problem of sewage disposal is currently active since Charles County is planning to permit a high density zoning for Charles City and its environs, with a long sewage pipeline along the Mattawoman Creek to a treatment plant, on or near the Potomac River, now set for Mason Springs.

Charles County officials do not want the Prince George's County developers dumping their sewage on Charles County, nor using their proposed wastewater treatment facilities to go up at Mason Springs. You will probably hear from Charles County for some money, if you haven't already heard fromthem.

While you are considering giving this huge gift of money to Prince George's County, Maryland, for the Piscataway Wastewater Treatment Plant, I think that you would be wise to find out what they are planning to do about this hugh density, proposedsatellite city down along the Mattawoman Creek, and how they plan to dispose of sewage from that plant? The only way this sewage can go is in the direction of the Potomac River or the Putuxent River, and Charles County is not happy about the Prince George's County's developmental plans. You can check this out with the Charles County Commissioners, one of whom, a Mr. Simpson has already written to the CITIZEN NEWS, expressing his objection to this 'across-the-border' project of Prince George's County.

In any event, I would like to suggest that you 'nail-down' the Piscataway Wastewater Treatment facility in terms of their present and future plans for sewage sludge disposal, both on-site and off-site, with a look-see into the future, since it is now obvious that they plan to triple their presently ambiticus plans for their Plant expansion.

You are probably well aware, that the disposal of waste water by dumping it in the Potomac River, treated or otherwise, is only one half of the job. The sludge disposal is the, equally essential, other piece of the apple.

I trust that you and your expert staff will give very careful attention to my referrals, since, as a local, state, and federal taxpayer, not to mention my unconcionable tax bill to the Washington Suburban Sanitary Commission, I am very much interested in how my money is spent by governmental agencies.

Very truly yours,

John H Buckingham Jr

John H. Buckingham, Jr., Manager,
NETHERWOOD CREEK WILDLIFE REFUGE.

Enclosure.

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Response: Netherwood Creek Wildlife Refuge

①

An analysis of this alternative has been included in the Final EIS. The effluent line is being sized large enough to handle any flows which may be considered at a later date, in order to avoid a repeated disruption of parklands.

②

The Piscataway Facility is designed to provide reasonable assurances against mechanical breakdown or overload conditions.

③

Alternatives to incineration have been discussed in the Final EIS to include WSSC's contingency plan for sludge treatment and disposal. It is EPA's policy to encourage recycling and re-use when the circumstances and appropriate natural conditions exist.

THE PALISADES CITIZENS ASSOCIATION
Serving the area between the Potomac River, Foxhall Road, Loughboro Road and District Line
WASHINGTON, D. C.

7 March 1974

Reference: Upgrading and Possible Expansion of the WSSC
Piscataway Wastewater Treatment Facility

Impact Statement No.: 3-030-IS-M-1

In responseto Mr. Snyder's February 5, 1974 memorandum, the Palisades Citizens Association wishes to go on record as opposing use of Federal funds to assist Prince Georges County in building sewage disposal facilities so long as the Countyis in default of its commitments to limit the sewage flowing into the Blue Plains Facility.

Furthermore, we feel that, if the E.P.A. determines that Prince Georges County cannot fulfill its commitments to restrict theflow of sewage without the assistance of Federal funds, then such funds should only beapproved if it is certain that funds allocable to responsible jurisdictions are not thereby reduced.

Response: The Palisades Citizens Association

These concerns have been resolved by the June, 1974 Blue Plains Agreement signed by all responsible agencies.

Comments by
W. L. Callaway
301 Pine Road
Piscataway Hills
at the hearing on the draft
environmental impact statement
March 7 1974

Section III is labled Alternatives and the opening paragraph sets out to slam the door on any alternative which does not fully utilize all facilities already in place or presently under construction as "unrealistic" and falling short of maximum economic efficiency. this then seems to be adequate justification to omit consideration of any such alternative.

Section IIIA says that we must expand the 5MGD AWT to match the 30MGD secondary treatment.

Once this conclusion is reached it is easy to conclude in Section IIIB that the AWT should be colocated with the secondary treatment.

The proposed 108" pipeline running 3.4 miles across historical lands is far larger than required for a 30 MGD AWT and pages 20 & 22 make it clear that expansion up to 95, 110, 152 and even 325 MGD (peak) easily accomodated and are anticipated. These long-range expansion plans then are the basis for the 9 foot pipe.

Once that is approved and under construction, it would be ([illegible]) "unrealistic and less than optimum economic efficiency" not to expand the plant to fully utilize the big pipe.

253

This is the same technique utilized elsewhere in our government establishment to get a foothold on a new multi-billion dollar project without revealing the impact of the total project at the beginning. Once material sums are sunk, then the progenitors cry, "It is economically ridiculous to not follow through with the full program." I suggest that the ridiculous part was displayed when the full impact was not revealed before the cost was sunk and hereby call for an impact statement which matches the 9 foot pipe and the 152 MGD capacity.

Section IIIC discards the alternative of locating smaller decentralized facilities at sites throughout the design service area. No data is given to support the rejection of this alternative and the conclusion seems to be based on intuitive judgments that operating and maintenance costs would be prohibitive. Is no one willing to concede that the state of the art is being advanced and that these smaller plants may well be the more efficient.

Even more troublesome, no cost or environmental trade-off studies seem to have been made of this alternative compared to the construction of a 9 foot pipe to carry raw sewage from Anacostia to Piscataway via Blue Plairs. What the hell is the economic and environmental result of a rupture of a 9 foot pipe carrying raw sewage? It took almost a year for WSSC to repair a rupture of an

8 inch pipe carrying raw sewage through the back of my lot!

I submit that Alternative IIIC has been given grossly inadequate consideration, both from an economic and environmental viewpoint.

In reviewing the discussion of land treatment of effluent on pages 77-90 one quickly concludes that this method is desirable if quantities of effluent are not overwhelmingly great and suitable land areas are available nearby. Utilization of this technique with facilities located at decentralized sites throughout the design service area would seem to be an early alternative to be studied. This combination appears not to have been considered at all. At least the report we have here has omitted any mention of it.

The conclusion reached with respect to land treatment of effluent for the Piscataway plant is that the capital cost is prohibitive. The entire case for this conclusion is based on an estimated land requirement of 250 acres per MGD. It appears to me that if the Ag. Dept. says that the ~~[illegible]~~ soils in the area are not suitable for irrigation using spray techniques (page 84-85), we are left with the spray - runoff and Infiltration-Percolation systems (page 8) which require from 3 to 140 acres per MGD--NOT 250 acres as used here. ~~[illegible]~~

With respect to your taking the data from the Bechtel report of Nov., 1972 and "scaling-up" the costs, you have gone in the wrong direction. Scaling-down would be better; however, in reality no "scaling" is appropriate since the costs are partly fixed and partly variable. You must get behind the totals to determine which portion is variable.

My point here is that you have devoted many pages to discrediting land treatment on economic grounds and your economic analysis methodology is inadequate.

To summarize. . . . . .

Here we have an attempt at an impact statement for the operation of a 30 MGD plant when it is clear that what is really needed is an economic and evnironmental analysis on a 152 MGD plant compared to the alternatives to a large regional treatment system.

In the process of developing the analysis of alternatives we must expect and demand advances in sewage treatment technique ~~the state of the art~~ if we are not to be covered in our own waste.

Response: W. L. Callaway

The EIS has been revised to reflect these concerns and to clarify EPA's approach and opinion concerning the proposed action.

Rt. 1, Box 711-I
Accokeek, Md. 20607

Statement for EPA Public Hearing, March 7, 1974 on Piscataway Wastewater Treatment Plant

Director, Region 3
Environmental Protection Agency

Dear Sir:

There are at least two points in the draft Environmental Impact Statement which are open to serious question, and my remarks are addressed to them.

(I). The first is the general conclusion on page 6 of Appendix H concerning composting of sludge as an alternative to incineration. Referring to paragrap (n) of page H6, we see the general and unsupported conclusion that "high production costs, limited technology and an uncertain market for the compost product usually prevent this process from being seriously considered as a disposal method." I question what is meant by "high production costs": sludge is presented freely as a disposal product, and any processing costs in terms of energy, labor and material inputs are certainly not shown here to exceed the vast outlays of fuel and chemicals proposed for incineration. Experience with the Beltsville pilot composting project would seem to cast doubt on this argument, as well as that of "limited technology".

As to an "uncertain market for the compost product", this seems even less supportable in these times. There are commercial sludge compost on the market today, not to mention the fact that the nation is faced with a severe fertilizer shortage that threatens upcoming crop yields. In sum, the conclusions of paragraph (n), page H6 do not provide a convincing argument fo the rejection of composting as a viable means of sludge disposal.

(2). A more serious objection arises in regard to the caveat on page 9 of Appendix A. The first paragraph of page A9 warns that an efficiency of 99.9% is demanded of the venturi scrubber in order to hold particulate emission below the tolerable levels on which justification of incineration is based. Are we to understand that safe operation of this system depends on 99.9% operating efficiency of one specific part? There are very few devices in the physical world that work at anywhere near this efficiency, even under ideal conditions. What assurance is there that the scrubbers will be kept at 99.9% efficiency on a daily operating basis, or for any meaningful length of time whatever?

It seems clear to me that an evaluation must allow for the realistic probability of degradation of scrubber performance, and that corresponding figures for increased pollutant output should be published. Could the impact statement allow the proposed incineration at 95%, or 90, or 80% efficiency, for example? I don't have supporting figures, but my recollection is that particulate emission would rise drastically with a relatively small drop in scrubber efficiency.

In other words, the present evaluation, based on absolute peak performance of the incineration equipment, concludes that the operation of the incineration equipment, would probably not be harmful to health. But if we assume the more realistic probability of less than peak performance, day in and day out, then the conclusion as to safe operation seems dubious, to say the least. We need a safety factor applied to incinerator operation, which is glaringly absent in the present study.

In conclusion, I believe that both the question of sludge composting as an alternative to incineration, and the question of likely operating efficiency of the venturi scrubber, must be more thoroughly and realistically treated in any final impact statement.

Respectfully submitted,

Stuart G. Hibben

Response: Stuart G. Hibben

The EIS has been revised to reflect these concerns and to clarify EPA's approach and opinion concerning the proposed project.

Testimony Presented by Lung Association of Southern Maryland, before Environmental Protection Agency Hearing, March 6, 1974 Dealing with Operation of Sewage-Slude Incinerator, Piscataway, Prince George's County, Maryland.

Daniel J. Snyder III
Regional Administrator
Environmental Protection Agency, Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Sir:

In reaction to the draft environmental impact statement on this facility prepared by EPA, this Association wishes to voice serious misgivings as to the completeness of this statement and its treatment of several problems of importance to continued community health. Specifically, the treatment concerning the particular virulence of the pollutants involved, the topographical unsuitability of the site, and likelihood of low-sulfur fuel oil being unavailable for the operation of the plant are elements of this impact statement of utmost importance to the community involved and which are not answered to our satisfaction.

Contrary to popular belief, digested sewage sludge is not neutralized of harmful bacteria. Furthermore, it contains several elements beyond the normal catalog of toxid substances created in combustion which makes its contribution to air pollution particularly hair-raising. One such substance innate in sludge which ① may not be killed during incineration is the bacterium klebsiella. This organism is the agent of possibly the most deadly form of bacterial pneumonia, with resulting mortality rates from untreated cases as high as 90%, and as high as 70% even in treated cases. Any process which releases this organism into the air near a populated area must be regarded as a serious threat to public health, yet the possible spread of pathogens by this facility is barely touched upon in this draft. Also unconsidered was the possible character of the sludge involved, which, should it include industrial material from the Anacostia area, would be further laden with heavy metals and chemical substances. The assumption of a homogenous character in the sludge to be treated, as put forth in this report, we feel to be a wrong one which should be further considered.

Another substance which must be dealt with is lead, and its violent effects when absorbed even in small quantities into the human body. Damage from this substance is irreversible, and may be manifested by lead anemia, lead encephalopathy (brain damage ranging in symptoms from lethargy to coma), and lead polyneuropathy or palsy. Standards for emissions of this substance have not been adopted as of the preparation of the report in question, but as this sludge incinerator will emit between five and sixty tons per year of lead into the air of neighboring communities, projections of possible damage must be included for a through report.

Adding to the above and all other objections are those of topography. A worse site could not have been deliberately chosen for this operation. The Piscataway incinerator is located near the bottom of a geographic 'dish" with 200-foot hills rising little more than a mile sway. The smokestack of the incinerator is only sixty feet high, leading to an undispersed concentration of all pollutants within this basin. Were this situation about to occur in a suburb of Chicago it would be bad enough, but in an area such ② as the Washington suburbs, where seven full scale air pollution alerts occurred this past season, it becomes even more unthinkable.

Using weather information on Dulles Airport, which has similar topography and no sludge incinerator, it is calculated that there is at least a 70% chance of an inversion occurring in the Piscataway basin, given the right circumstances. This would subject residents of that area not just to exposure to air pollution, but to repeated, periodic fumigation, magnifying this threat to well being. Material relating to weather conditions in the EPA impact statement does not sufficiently reflect these situations.

③ An additional factor not brought into consideration is the likelihood that due to the energy crisis, the #2 fuel oil for which the incinerator was designed will not be available and #5 or 6, much heavier oils, would have to be used. This would raise the sulfur content of the fuel being used from .3% to .8%, further exaggerating this already outrageous problem. Even though the Washington Suburban Sanitary Commission holds priorities for this grade of fuel, its availability under any circumstances may be sharply curtailed in the future. In addition, this use of a valuable and scarce fuel to destroy a substance which has application as a soil builder and which could be made available to the extensive agricultural areas adjacent to this facility also displays poor judgement.

Sludge disposal has been a major housekeeping problem for this region for some time, but to railroad a facility such as this incinerator into operation is one of the worst possible solutions to the problem. The Maryland Department of Health and Mental Hygiene estimates that there are nearly 2,300 abandoned strip mines in Maryland alone, and many of these sites have been successfully reclaimed through use as sanitary landfills. To put sewage sludge to use in this manner, to recycle land in a workable and imaginative way and make our environmental problems cancel out each other is what we need, not such projects as this incinerator.

Having weighed all facts, the Lung Association of Southern Maryland, in recognition of its mandates in the fields of Air Conservation and the prevention of respiratory disease, must go on record as being opposed to the operation of this facility unless the problems and inconsistencies we have addressed can be disposed of.

Signed,

/s/

Frank S. Whitmore
Executive Director

/s/

Merilyn Reeves
Environmental Health Committee

/s/
James Beek
Community Relations Director

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LUNG ASSOCIATION OF SOUTHERN MARYLAND, INC.
5215 Church Place
Hyattsville, Md. 20781

Phone: 927-5181

Response: Mr. James Beek, Lung Association of Southern Maryland

①

Preliminary conclusions are in Appendix A, B, and C. The Battelle and University of Maryland studies will provide for definitive conclusions.

②

Topography and meteorology are considered in the use of the Climatological Dispersion Model.

③

The use of higher sulfur fuel-considered unlikely-will increase SO_x emissions proportionately. Depositing WSSC sludge in abandoned strip mines must overcome current political problems.

13502 Piscataway Drive
Oxon Hill, Maryland 20022

March 19, 1974

Mr. Robert J. Blanco, P.E.
Chief, Environmental Impact Branch
United States Environmental Protection Agency
Region III
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Sir:

Subject: Draft Environmental Impact Statement -
Piscataway Wastewater Treatment Plant Expansion

Expansion of the Piscataway Wastewater Treatment Plant to 30 MGD is a major undertaking which deserves a thorough impact statement. The word "thorough" cannot be applied to this document. Many deficiencies are quite apparent, even to those who, like me, are not experts in sewage treatment. The credibility of any part of this statement, and of EPA, is damaged by the glaring omissions and slanted presentation of the material which is presented.

Partial Listing of Deficiencies. The statement does not contain information on many relevant subjects. For example, it does not spell out precisely: ①

- What materials would be in the sewage to be treated.
- The disposition of all materials entering the treatment process (sewage, chemicals, fuels), especially toxic materials that will enter the atmosphere through the incineration process. ②
- The specific dispersion pattern of gases from these incinerator stacks. The statement does not even describe the topography of the area around the plant and the special problems it might pose. ③
- The possible effects of increased air pollution on nearby residents, including the old and infirm, infants, pregnant women, the very active, and those people already suffering from respiratory ailments. The statement does not even indicate the number of people who will be directly or indirectly affected by the project, their location, etc. ④
- The cumulative impact of air pollution from multiple incineration points in the area (i.e., Piscataway and Blue Plains). ⑤
- An analysis of the present air quality in the vicinity of the plant. ⑥

- Margins of safety being allowed in the analysis. ⑦

- The monitoring and testing procedures to be used, first to prove the plant's safety and then to insure its continued safe operation. ⑧

- The impact if low sulphur fuel is not available for the incineration process. ⑨

- The affect on the bay and its biota if the effluent is allowed to flow into the bay versus being pumped to the Potomac. Also, how do these alternatives compare both to limiting the plant size to 15 MGD and to not putting any treated water in the bay or Potomac (i.e., going to a land-based system). ⑩

- ⑪ The impact of the plant expansion on growth and development in the area. This includes an analysis of total impact of growth on air quality (more cars, fireplaces, etc.) and water quality (more siltation, etc.).

- The complete cost analysis of all alternatives. The fact that facilities are already built might penalize alternatives not using them, but certainty is not an excuse for avoiding the analysis. Also, cost benefits of alternatives must be considered. ⑫

These are but a few examples which are readily apparent to the general public.

Slanting of data was common. For example, in one case where a cost analysis was attempted, the methodology and assumptions used were wholly unsupportable. The object of the analysis was to prove that land treatment was more costly than incineration. ⑬

The analysis:

- Concluded that 250 A/MGD was required for land treatment. However, in previous paragraphs, and tables, the statement indicates that a maximum of 140 A/MGD was required for the two land treatment methods recommended for the area. In fact, as little as 3 A/MGD might be required. (This vast differential in and of itself cries for a more detailed study of the alternatives.) Using 3 A/MGD and 140 A/MGD at a 95 MGD level results in costs of $855,000 and $39.9 million respectively (at $3,000/A). This compares to $120 million for conventional AWT as computed in the report (page 86).

- Assumed that the land treatment had to be done in this area. Other areas might be better, and land costs might be less.

- Ignores the benefits (negative costs) to be derived from land productivity, sale of composted sludge, etc.

- Ignores the "not nearly low enough" operating cost benefit of land treatment of $1.5 million a year. This is only $37.5 million over a 25 year period.

- Ignores the lost opportunity costs (possibly much more important in the future than the dollar cost) of resources wasted in incineration.

- Ignores the cost benefit of flexibility and residual (salvage) value which land treatment provides when technical advances are made. There is no market for slightly used sewage treatment plants, whereas land will probably increase in value and has alternate uses if no longer needed for sewage treatment purposes.

Other specific deficiencies have been pointed out by Dr. James Repace, William Moran, Marion Agnew, and others. Their points certainly must be fully treated in the next statement draft.

Scope of Study

One glaring problem is the study's vacillation between discussing a plant at 30 MGD to serve the needs of Southern Prince George's County and a larger plant--up to 500 MGD plus--to serve the Anacostia Basin and, in fact, the entire metropolitan area. Of course, the study selects that data which best fits the conclusions to be reached. For example, the alternate of land treatment was discussed for a large plant, and the conclusion reached, quite falsely as shown above, that incineration was less costly than a land treatment system and was therefore not feasible for the long run. The pollution aspect of incineration was discussed only from the standpoint of a 30 MGD plant, and the conclusion reached (without support) that the process was not harmful. Why was a cost analysis of land treatment for a 30 MGD plant not provided? Because its cost compares favorably to incineration? Why was the pollution aspect of incineration of sludge from a 500 MGD plant not considered? Because it would show that no one could live anywhere near the plant without being poisoned? ⑭

As a matter of fact, WSSC has stated its intention to expand Piscataway to 250 MGD and more. The County Council has authorized expansion of the plant to 95 MGD and is considering further authorization. The history of Piscataway shows a pattern of WSSC justifying expansion based on "existing facilities", EPA itself "buys" this theory without question in its current report (see first sentence, Section III, page 75), and the current project includes an effluent pipeline which can accommodate over 500 MGD. Therefore, to consider this expansion project as anything other than one phase of an expansion to a plant of between 350 and 500 MGD is unrealistic, to say the least. The impact statement, of course, denies the fact that approval of this project will have any bearing on future expansion. This brings to mind a famous quotation about protesting too much. How does this square with the justification used on page 85, first full paragraph, when evaluating land based systems? If ease in expansion is a consideration, then how easy will it be to expand the incinerators to 152 MGD? 350 MGD? 500 MGD? What will the effect be on water quality in the bay and river when expansion occurs? Again, what are the realities of the situation? When being reworked, one of two approaches must be taken:

- The project and the study should be limited to a 30 MGD plant. All projects, including the effluent pipeline, should be limited to a plant of that size. All cost analyses should be made accordingly; or,
- the project study should be on the first phase of a 500 MGD plant. Therefore, it must include all appropriate data relevant to its ultimate size, including effect on air quality, water quality, and development; Appropriate cost analyses, etc.

In either case, the study must address the points outlined in the previous section of this letter and by others.

Conclusions

This statement must be reworked to correct the deficiencies mentioned. This project is too important not to do a complete and thorough job. The statement must be republished in draft form and another public hearing held. In the meanwhile, EPA should order WSSC to stop operation of the sludge incinerators and stop any action now being taken to construct the pipeline, further additions to the plant, and force mains which would be used to send sewage to an expanded plant.

Very truly yours,

David L. Wilt
David L. Wilt

Response: David L. Wilt

①-⑨

The EIS has been revised to reflect these concerns, and thorough discussion will be given in the Supplement to this Final EIS.

⑩ ⑪

These concerns have been addressed in the Final EIS for the proposed project.

⑫

Cost considerations were used in evaluating alternatives, however, some alternatives were found not to be feasible for other reasons (environmental).

⑬

The EIS has been so corrected.

⑭

The EIS is limited to 30 mgd AWT. Reasons for installing a "larger than presently needed" effluent discharge pipe have been presented in the Final EIS.

March 19, 1974

Daniel J. Snyder III, Regional Administrator
% Director of Public Affairs
Environmental Protection Agency, Region III
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

Subject: Impact Statement on Expansion of
Piscataway Waste Treatment Plant

Dear Mr. Snyder:

On behalf of the Piscataway Hills Citizens Association, I wish to state that the above impact statement is deficient in the following areas:

1. The potential damages that sludge incineration offers to the immediate vicinity of the treatment plant the surrounding homes in Poscataway Hills are not covered by this draft. This draft should deal particularly with elements found by EPA in stack samples from sewage sludge incinerators, which tend to be biologically non-degradable in human tissue and are toxic at certain concentrations. Some of these elements are cadmium, arsenic, beryllium, nickel, cobalt, lead, chromium, vanadium, and mercury. ①

2. The failure of the Sludge Incinerator Diffusion Analysis to provide accurate analysis of wind data in Piscataway Bay area. No consideration was taken of the surrounding 200 foot topography compared to the 60 foot stack elevation and the high chances of inversion occuring there. ②

3. The recommendation of the construction of an 108 inch outfall pipe should not appear in this draft unless accompanied by an impact statement on the maximum size (457 mdg) treatment plant this pipe would serve. This report deals only with a treatment plant the size of 30 mgd and fails to recognize that endorsement of an 108 inch pipe would open the plant to full development. ③

These are glaring deficiencies that strike at the very reason an impact statement is needed. We appreciate the great effort that was required to compile this draft, but we feel more study is required in order to correct these deficiencies.

We recommend that EPA undertake to produce a second revised draft impact statement and that no action be taken by WSSC to start operation of the sludge incinerators or the construction of an 108 inch outfall pipe until a final Environmental Impact Statement is approved and published.

We would appreciate being informed by EPA on any further action contemplated by them on this matter.

Sincerely,

James D. Spart

James D. Spart
President,
Piscataway Hills Citizens Association
600 Cedar Avenue
Oxon Hill, Maryland 20023

Response: President, Piscataway Hills Citizens Association

①

Preliminary findings concerning lead and mercury are found in Appendixes A, B, and C. The more comprehensive program outlined as Attachment 4 in Appendix A indicates the range of toxic materials which will be studied and reported in the Supplement to this EIS. See response #10 to "25 Questions".

②

The Climatological Dispersion Model used in the preliminary diffusion analyses does include input data on topography and atmospheric stability. See response #18 to "25 Questions".

③

Section IV.B.2. does discuss the effect of larger amounts of Piscataway effluent on the estuary. Endorsement of the 108-inch pipe does not "open the plant to full development", although it is true that additional capacity is contemplated by the Maryland Environmental Service.

ALICE FERGUSON FOUNDATION, INC.
Route 1, Box 618
ACCOKEEK, MARYLAND 20607

March 20, 1974

Mr. Robert J. Blanco, Chief
Environmental Impact Branch
U. S. Environmental Protection Agency, Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Re. Draft EIS for Piscataway sewer Plant extension.

Dear Mr. Blanco:

At a March 7, 1974 hearing on the Draft Environmental Impact Statement for the Piscataway sewer plant extension, I made an oral presentation on behalf of the Alice Ferguson Foundation and supplied the hearing recorder with a copy of a summary of my presentation. Since that hearing I have made minor modifications in the written summary to reflect more closely my oral presentation at the March 7 hearing.

I have also prepared a technical supplement to my March 7 presentation. Copies of both of these papers are enclosed herewith for your careful consideration prior to issuing the final Environmental Impact Statement.

Sincerely yours,

Robert Ruskin

Robert Ruskin, President

275

ALICE FERGUSON FOUNDATION, INC.
Route 1, Box 618
ACCOKEEK, MARYLAND 20607

7 March 1974

Statement of Robert Ruskin, President of Alice Ferguson Foundation on deficiencies of the Draft Environmental Impact Statement as it related to the impact of the Piscataway Sewer Plant expansion on the Foundation's Environmental Education Program for school children of Prince Georges and Charles Counties (revised 18 March 1974 to reflect more closely the oral presentation of 7 March):

① The Draft Environmental Impact Statement is deficient in several major areas. While listing the minimal impact on several historical sites further from the outfall pipe, it completely omits the impact on the environmental education program which has been conducted for several years by the Ferguson Foundation for several thousand children per year from Prince Georges and Charles County schools. This program is operated in cooperation with the National Park Service and the two county school systems, partly on 130 acres of foundation property and partly on 85 acres previously donated by the foundation to the Piscataway National Park. This portion includes the fields immediately adjoining the outfall pipe along its last mile. This outdoor education program is well structured with a teacher or interpretor with each group of students. It makes use of an operating farm and ecology training trails along the Potomac and along and over marsh and swamp areas with foot bridges. The marsh is fed by the Potomac at the very point where the sewage outfall will flow into the shore and then upstream along the shore and, as stated on p 126, will "concentrate around Mockley Point." ② This type of flow as shown by dye tracers to circle from the proposed discharge pipe to the shore and upstream along the shore was verified by my observations of driftwood and by Dr. Henry Ferguson, who owned this farm and who endowed this foundation before his death. No mention of this pollution problem is included in the draft. We feel very bad about any outfall pipe, but if a pipe is approved, it should extend into the river far enough so that effluent does not concentrate on shore.

③ Another area in which the impact statement is deficient is the following: It is planned that the off-shore portion of the outfall pipe will require 8-10 months to construct concurrently with the land portion; hence access to the river will not be available via the right-of-way. The only current access for equipment transport to that area is over the Ferguson farm roads. No mention is made of the impact that such traffic (if allowed) would have on the farm or its education program.

④ A major deficiency in the impact statement is its failure to provide any data on the frequency or severity of atmospheric temperature inversions which would trap incinerator effluent in the Piscataway valley and into the hillsides. No tests were made to determine trajectories with inversions present at various heights. The cursory treatment of inversions on p 29 indicates more frequent low inversions in rural than city areas, but dismisses the matter by saying that "In rural areas, it would be somewhat easier to emit pollutants above the low-lying inversions, where they would be susceptible to better dispersion." Never mind that no provision is made to do this nor could.

there be without an unsightly stack 200 feet high just to reach ground level of the hilltop according to the contours shown in appendix K. No mention is made of the impact of the incinerator effluent on the employees and school children on the hillside at the Ferguson Farm, when an inversion traps the effluent and directs it into the hillside. The record of one of the first hearings on the sewer plant in the early 1960's will show that, based on my background as an atmospheric physicist, I warned at that time that locating the plant in a narrow valley with steep sides would cause any gaseous effluent or odor to be trapped by inversions and concentrated on the hillsides. The fact that odors from the plant and/or its nearby polluted marshes have been smelled on the hillside is proof that this does, in fact, occur. The concentrations of mercury and lead expected in the effluent with even 30 MGD capacity could then be hazardous, and with 95 MGD, a disaster. A humorous logic typical of WSSC is found on p 132, where it is stated that the annual average ambient levels from 30 MGD should not present a health hazard; however, with 95 MGD the potential would increase and, secondly, "annual average concentrations within safe ranges do not necessarily imply that occasional episodes of higher concentrations would not occur." Then with a different typewriter someone had changed to a contradictory conclusion stating "Consequently, if the sewage facility is expanded to 95 MGD or greater, these caveats may preclude alternative means of sludge disposal other than incineration." How stupid do they think we are? ⑤

⑥ Another major deficiency in the impact statement is its avoidance of addressing the impact of 457 MGD of effluent which is stated in Appendix K9 to be the design capacity and planned output of the 108-inch outfall pipe. It is totally misleading when it states on p 126 that the impact on the river "should be minimal due to the relatively small amount of effluent (30 MGD) compared to the large quantity of river water;" yet it states on p 2 that in the late 1970's it "is planned to be expanded in order to service the entire Potentially Serviceable Area," which includes much of Prince Georges and part of Montgomery County. According to p 20, plans by Prince Georges County, WSSC, and MES call for expansion to 95 MGD by 1983 and this expansion is already approved by PG and Maryland, according to Appendix K7. Quoting from Appendix K9, "beyond year 2000, in accordance with present land use plans and zoning it will be necessary to pump the effluent through the line to convey peak effluent flows of up to 457 MGD." A sewage flow of 457 MGD would be more than the present total flow at Great Falls in normal dry periods (394 MGD per p 43). When added to planned effluent increases upstream, the Potomac would be three fourths sewage. According to p 130, expansion beyond 95 MGD would overpollute the Potomac unless the effluent quality were better than can presently be achieved. How can the impact statement justify a 457 MGD pipe with talk about the minimal impact of 30 MGD? It should either face the impact of a 457 MGD flow or require the size to be limited to that for flows which do not impact severely on the river and on the Ferguson education program. Whereas p 146 states that EPA would not be "locked in" to a larger plant by $8 million investment for the 108-inch pipe, yet p 75 justifies the first expansion to 30 MGD and use of incineration on the basis that present investments of $17 million in facilities "makes any alternative which does not utilize the existing facilities unrealistic." Who is kidding who?

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The only possibility of minimal impact on the Potomac and on the Ferguson Foundation operations is by using one or more alternatives, such as one of the land treatment systems shown on p 80. The main objection to land disposal is stated to be the large capital investment required. The $8 million saved on the outfall pipe would pay nearly half of the estimated land cost for 30 MGD. However, after spending most of the book downgrading the impact of 30 MGD, the land-treatment section suddenly jumps to 152 MGD to prove it to be too expensive and land consuming; yet on p 130 it indicates that the river cannot handle 152 MGD; but still they should put in a 457 MGD pipe. What logic! If all of this sewage has to come to Piscataway, the only logical way that the effluent could be disposed of would be by splitting it between two or more methods; yet on p 85 it states that splitting it would be illogical and uneconomical. Apparently EPA needs to justify the fact that, as stated on p 90, WSSC has already made the decision not even to pursue the land treatment method. Is the EPA a rubber stamp for an unimaginative WSSC? Why not combine the land-treatment system with a "fuel farm" to grow crops to make alcohol for a gasoline supplement? Avoid health worries from the crops. Use some of the sludge, also. When the pipes are put in to bring Montgomery County's sewage to Piscataway, such that it must expand beyond 30 MGD, put in an extra pipe in the same trench to return that part of the effluent to fuel farms in Montgomery County. Better yet, save more money by eliminating both pipes by putting Montgomery's sewer plant in Montgomery County. ⑦

ALICE FERGUSON FOUNDATION, INC.
Route 1, Box 418
ACCOKEEK, MARYLAND 20607

20 March 1974

Technical supplement to the summary statement of Robert Ruskin at the EPA panel hearing on the Draft EIS for Piscataway sewer plant expansion.

The discussion in the first paragraph of the attached statement presented at the EPA hearing on 7 March 1974 is concerned that, while there is stated that dye tests showed that the outfall pipe effluent from the planned discharge point would concentrate around Mockley Point, no statement was made of the impact which such concentrating would have on the Piscataway National Park and the environmental education program being conducted jointly by the Ferguson Foundation, National Park Service, and the public school systems of Prince Georges and Charles Counties. Depending on how often the sewer plant malfunctions after the effluent is hidden in the pipe, it is likely that 95 MGD discharged into the river would require closing down the portion of the program using the marsh and beach areas. Additionally, some of the archaeological sites shown on the map of the pipe and its environment are located along the shore extending between the pipe and the environmental training trail and beach area. ⑧

In reference to paragraph 3, on the impact of incinerator effluent on the Ferguson Foundation, the EIS should not be approved until it adequately addresses the question of trajectories of incinerator effluent when inversions are present at various heights and intensities. Data from Dulles indicate inversions at some time during 70% of the days; hence, it would not be practical to close down the incinerators for each inversion. The only possibility of safely allowing lead and mercury emissions as proposed is to know what their concentrations will be on the hillsides when inversions are present. Is it not the responsibility of EPA and/or WSSC to determine that incineration is safe before doing it? It is unfortunate that WSSC invested so much money in incinerators before determining the effects of inversions, but this is strictly their choice, apparently resulting from a lack of foresight and competence of whoever made the decision or whoever provided the engineering to the decision makers. It is not from lack of warning if, at an early hearing on Piscataway, WSSC had taken seriously the input I gave them on the effect of inversions for a valley installation. Unfortunately WSSC has generally considered citizen input to be just an irritation that must be put up with, rather than making use of the information generated. I suggest that if further consideration is to be given to incineration, then before approving it EPA should bring in the Maryland state power plant siting people, such as Dr. Jerry Pell of Department of Natural Resources, Bureau of Air Quality and/or their contractors who have been instrumenting micrometeorological towers and tethered Kytoons at Chalk Point and ⑨

Dickerson power plant sites to measure the temperature profiles to obtain data on air stability and inversions. The reason I am familiar with this work is that several of the investigators involved have come to me for advice on instrumentation and techniques in the micrometeorology area and have incorporated several of my suggestions. I had hoped that the school children in the Ferguson environmental education program might make a study of inversions by using the toy rockets which are now available with temperature sensors disigned for the purpose of measuring inversions, but the Foundation has not had the time nor manpower to set up the study. Does not the responsibility for this kind of data lie with WSSC or EPA, rather than with the citizens? Based on past experience, if we did provide information showing inversions, WSSC would only consider it a harassment. While I do not pretend to be expert in areas other than parts of atmospheric physics, one alternative to incineration for sludge disposal which has been suggested is to pipe it as a slurry to a railhead, dry it there, then use empty coal cars returning to the mines to haul sludge to rehabilitate strip mines. Plenty of Maryland tobacco farms also need rehabilitating, but I understand Charles or St Mary's County has a law against bringing sludge into the county. The Blue Plains experiment in drying and bagging it may get better sludge to these counties at added cost to the farmers. If so, Piscataway might solve its sludge disposal problem similarly. Have these methods been investigated as alternatives to incineration?

In reference to my paragraph 4, while the point in the EIS is valid that the land should not be torn up more than once for the outfall pipe, still I maintain that its size should be limited to what the Potomac can stand, including the flows from up-river projected for the times when the outfall effluent is planned to be increased. Part of the consideration as to what the river can stand should include the impact on the Ferguson outdoor education program by the polluted water entering our marshes and fouling the beach. If the time ever comes when Ferguson Foundation is not operating the program, the problem is still not solved because then National Park Service will use the area for other, probably more public and high-density uses. ⑩

As stated in paragraph 5, I seriously question the overall thinking in terms of solving all the future sewer problems of the entire metropolitan DC-Va-Md area by more of the same: discharging into the Potomac the effluent from all plants up and down the Potomac until it is three fourths sewage. Should not this overall problem be assessed before permitting a large investment in a pipe geared to this (in my opinion) obsolete planning? Is not now the best time to institute pilot programs to evaluate alternatives to river discharge, before the quantities get so large as to preclude handling by any single method, and before land prices get any higher? The outfall pipe can wait until some future expansion of the Piscataway plant. By then it will be better known what discharge the ⑪

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Potomac can stand in addition to that already in it upstream. Piscataway being nearest to cheapest land is the logical plant to try land treatment effluent disposal. If land treatment is successful, it would permit sewer plants further away from rivers and would open up several new possibilities for reducing the impact of the plants and on the disposal land, using shorter input pipes and locating plants nearer to the disposal fields, including in Montgomery and Fairfax Counties and other upstream areas. I was encouraged to hear Mr. Elliot of WSSC include land treatment as a possibility. Although some grains for food, I understand, can be grown on disposal land, the idea of producing alcohol for fuel would also permit some sludge use on the same farm with no health worries. While farming for alcohol production would require cross-disciplinary backgrounds for the engineers, would this not provide a valuable pilot project toward replenishable fuel?

I hope that these comments and questions can serve a constructive purpose in improving the EIS.

The Alice Ferguson Foundation hereby requests that no impact statement be approved which does not answer the following questions:

(1) What are the trajectories of effluent from the outfall pipe if located at various discharge distances from the shore and at several tide and river-flow conditions?

(2) What is the impact, including on the Ferguson Foundation programs, of the amount of effluent found to concentrate at the shore under the several conditions investigated under (1) above?

(3) At what frequencies and with what intensities do atmospheric stability and temperature inversions occur at the Piscataway plant?

(4) What will be the trajectories of the incinerator effluent for the several conditions of wind direction and atmospheric stability, including inversions located at various altitudes up to 500 feet?

(5) Based on the data of (3) and (4) above, what will be the impact on the Ferguson operations of the various conditions measured?

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(6) What will be the impact of the various outfall pipe flows projected, including the planned output of 457 MGD for the proposed 102 inch pipe, when considered in combination with other upstream sewage flows projected for the same time periods that each increase in outfall flow is planned?

(7) What size of pipe will carry the maximum flow which the Potomac can handle without unsatisfactory pollution impact, including on the Ferguson program, when considered in combination with the other discharges upstream projected for the same time period as that at which this flow will occur?

We further request that no permit be issued for any outfall pipe until land treatment and/or other alternative methods of effluent disposal have been tried or at least evaluated more fully from experience in other localities.

Thanks for your consideration of these questions.

Z82

Response: Alice Ferguson Foundation, Inc.

①

The right-of-way for the pipeline does not cross the properties which were donated by the foundation to Piscataway Park, nor does it cross the area currently utilized by the environmental education program. Thus, the effect on that program, other than in the form of noise, will most likely be minimal. Further, in the operation of an environmental education program, it is equally important to make the student aware of man's interaction with the environment. Thus, a program which could encompass the operation of laying the pipe as part of an overall environmental education of Piscataway Park would have a beneficial rather than detrimental effect on the Alice Ferguson activities.

②

The EIS has been revised to reflect these concerns.

③

The only access which will be permitted to WSSC will be from their own property at the east end of the 50-foot right-of-way for the pipeline. No secondary access to the right-of-way or the river operation will be granted except in emergency situations.

④

Temperature inversions will occur in the vicinity of Piscataway and during these periods ground-level concentrations of some emissions will be higher than normal. However, for the emissions of concern, it is the long-term average concentrations which are related to public health and welfare. The preliminary findings in this EIS, using the Climatological Dispersion Model, account for the presence of inversions because a stability wind rose is a data input.

⑤

This inadvertent error has been corrected.

⑥

Peak flows are approximately twice that of average daily flows, due to the concentrations of human activity during certain hours of the day. Pipes must be built to convey these peaks. It is preferable to install a large pipe now (because labor, not material, costs are dominant for pipe installation). As stated in this EIS, any further Piscataway expansion must be thoroughly reviewed for environmental impact prior to EPA's making a grant offer. The Final EIS's discussion of alternatives does not consider unrealistic the possibility of not using all existing facilities, rather, use of existing facilities is considered to be a prime alternative.

⑦

Most of these concerns and alternatives have been discussed in the Final EIS; however, due to limited resources, the "fuel farm" concept has not been addressed.

⑧

The EIS has been revised to discuss these concerns, however, the EIS is limited to 30 mgd AWT additions to the Piscataway facility and the construction of an effluent discharge pipe. Impacts concerning a larger discharge will be evaluated when and if expansion is proposed.

⑨

See #4 above. The actions of EPA during recent months, we believe, reflect a prudent balance between protecting public health and pursuing a comprehensive testing program. See Section IV for a discussion of what has and will occur regarding the testing of the incinerator and considering alternative means of sludge disposal.

⑩

See Section IV.B.2. for a discussion of the loading limits of the estuary in the Piscataway reach.

⑪

This concern has been addressed and EPA's opinion is clearly stated in the Final EIS.

March 22, 1974

Dear Sir:

I attended the public hearing concerning the EPA Impact Statement Draft in Oxon Hill, Maryland, March 7, 1974. I came prepared to speak but did not due to the length of that boring evening. I deferred to the 40 speakers ahead of me. However, there are some points that were not covered:

The impact of this plant on the people in the area. This point was covered with one paragraph in your statement (P. J-25) which concerned itself entirely with temporary construction inconvenience. The Piscataway area seems sparsely populated. This is misleading. Within 1.78 miles radius of the plant there are 7356 people living in homes tucked out of sight in the hills.

People who presently live in the area are only minor when you consider the total impact on people. This is a major recreation area for the city. It is unique, being relatively unspoiled yet just 30 minutes by bus from downtown D.C. Several million people currently make use of this area. (1.5 million at Ft. Washington alone)

It is centered in a 15 mile scenic easement for Mt. Vernon intended for long-range recreational development with 50 year planning. The plant is already impinging on these plans. The recently build additions can be seen from Mt. Vernon as can the steam plumes from the stacks. WSSC acknowledges this as they also note that they expect their new administration building to be seen from Mt. Vernon. They have found it necessary to cut down the mature trees that used to shield the plant from view. There is an odor to the plant noticeable to neighboring homes and parkland. Construction will cause further deterioration of the environment. Sir, we are being nibbled to death by duck.

No one thing is significant but put together, they become ominous. At present the plant nearly overwhelms the small bay it sits on. Any further deterioration *will tip the balance.* The plant has destroyed the "untouched by man" atmosphere. Soon the valley - bay area will look "raped by man." It is no excuse to say that this is what we are doing elsewhere in our country.

This very unique "almost-wilderness" area so near the city should be preserved for the millions of people who will enjoy it as one of the few places they can reach to escape the concrete desolation they live with.

Your report, obviously biased in favor of the enlargement of the plant is a sad comment on what you are accomplishing in the name of your agency "environmental protection."

Jean Thompson
500 Pine Rd.
Oxon Hill
Maryland, 20022

P.S. Also enclosed is a letter, from a neighbor upon his being shown Table D4 "Birds sighted or heard in Piscataway" which lists 39 birds.

FT

602 Pine Road
Oxon Hill, Md. 20022
5 March 1974

Mrs. Jean Thompson
500 Pine Road
Oxon Hill, Md. 20022

Dear Mrs. Thompson:

This letter is in response to your request for a statement regarding my "birding" experiences in the Piscataway area.

For the past fifteen years, I have been a fairly avid bird-watcher, and have been a member of the National Audubon Society and the Southern Maryland Audubon Society for nearly five years. In the course of these activities I have compiled a "life" list of birds sighted which currently numbers more than 350 species. Most of these have been observed in Middle Atlantic States, and many within a twenty-five mile radius of Washington, D. C.

During the period from February 1956 to February 1973, I resided at 339 Onondaga Drive, Forest Heights, Md., and frequently visited the Piscataway area on "birding expeditions", including canoe trips on Piscataway Creek and the marshy areas surrounding Piscataway Bay. Indeed, the richness and variety of bird life which abounds in this area was one of the factors which prompted us to move to our present residency at 602 Pine Road.

Since moving to Piscataway Hills in February, 1973, we have maintained an accurate tabulation of bird species sighted in the area. To date, sixty-six species have been seen from the confines of our property at 602 Pine Road, while an additional thirty-one species have been observed in the surrounding areas. The activities associated with moving into a new home drastically curtailed our normal "birding" activities last year, especially during the Spring migration period. Hence, I consider this to be a minimal count, which can be expanded significantly through a more concerted effort.

The list of species we have sighted in the Piscataway Hills area during the past year is as follows:

1. Horned Grebe
2. Great Blue Heron
3. Whistling Swan
4. Canada Goose
5. Mallard
6. Black Duck
7. Wood Duck
8. Lesser Scaup
9. Bufflehead
10. Ruddy Duck
11. Common Merganser
12. Turkey Vulture
13. Red-tailed Hawk
14. Bald Eagle
15. Osprey
16. Sparrow Hawk
17. Bobwhite
18. Killdeer
19. Am. Woodcock
20. Herring gull
21. Ring-billed gull
22. Laughing gull
23. Mourning Dove
24. Yellow-billed Cuckoo
25. Black-billed Cuckoo
26. Screech Owl
27. Great Horned owl
28. Barred owl
29. Whip-poor-will
30. Chimney swift

31. Ruby-throated hummingbird
32. Yellow-shafted flicker
33. Pileated woodpecker
34. Red-bellied woodpecker
35. Yellow-bellied sapsucker
36. Hairy woodpecker
37. Downy woodpecker
38. Great crested flycatcher
39. Eastern phoebe
40. Eastern wood pewee
41. Purple martin
42. Blue jay
43. Common crow
44. Fish crow
45. Carolina chickadee
46. Tufted titmouse
47. White-breasted nuthatch
48. Red-breasted nuthatch
49. Brown creeper
50. Carolina wren
51. Long-billed marsh wren
52. Mockingbird
53. Catbird
54. Brown thrasher
55. Robin
56. Wood thrush
57. Hermit thrush
58. Bluebird
59. Blue-gray gnatcatcher
60. Golden-crowned kinglet
61. Ruby-crowned kinglet
62. Cedar waxwing
63. Starling
64. Red-eyed vireo
65. Black & white warbler
66. Parula warbler
67. Myrtle warbler
68. Blackburnian warbler
69. Blackpoll warbler
70. Pine warbler
71. Palm warbler
72. Yellowthroat warbler
73. Am. Redstart
74. House sparrow
75. Eastern meadowlark
76. Red-winged blackbird
77. Baltimore Oriole
78. Common Grackle
79. Brown headed cowbird
80. Scarlet tanager
81. Cardinal
82. Rose-breasted grosbeak
83. Evening grosbeak
84. Purple finch
85. Pine siskin
86. Am. Goldfinch
87. Red crossbill
88. Rufous-sided towhee
89. Slate-colored junco
90. Tree sparrow
91. Chipping sparrow
92. Field sparrow
93. White-throated sparrow
94. Fox sparrow
95. Swamp sparrow
96. Song sparrow
97. Winter wren

I trust that this list will serve to indicate the diversity of bird life which exists in the Piscataway area. Should you desire or require a more complete accounting of local bird populations, may I suggest that you contact Miss Kathleen Klimkiewicz, who has conducted extensive bird banding activities in the Piscataway-Accokeek area.

Another reliable source of bird population information is the Annual Christmas Bird Count conducted under the auspices of the National Audubon Society. The Accokeek, Md. area, which includes all points within a 15-mile diameter, center 1-1/2 miles north of Accokeek; east side of Potomac River from Bryan's Point east along south side of Piscataway Creek to Indian Head Highway, yielded 64 species and 3108 individuals on the January 3, 1971 count. One year later, 64 species were sighted again but the individual count was 6203. Details of these counts are contained in American Birds, Volume 25, No. 2 and Vol. 26, No. 2, respectively.

Sincerely,

R. E. Kagarise, Ph.D.

Response: Jean Thompson

The EIS has been revised to reflect these concerns emphasizing that all of the environmental impacts affect people. It is felt that the proposed project will not significantly degrade the physical and aesthetic appeals of the Piscataway area permanently. Treatment and disposal of man's waste has been and probably will always be one of man's most difficult and costly problems to cope with. Nobody wants their waste treatment facility in their "back yard". However, it is this Agency's opinion that all possible aesthetic considerations have been incorporated into the Piscataway facility, thereby mitigating these impacts as much as possible.

All of the birds listed by R. E. Kagarise have been identified in Appendix D. Table D.4. were those species sighted or heard on field investigations.

1320 No. Carolina Ave., N. E.
Washington, D. C. 20002
March 23, 1974

Mr. Robert Blanco, Chief
Environmental Impact Branch
EPA Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

It was a pleasure to meet you earlier this month at the hearings at Oxon Hill High School, Maryland, on the draft EPA EIS on the upgrading and expansion of the WSSC Piscataway wastewater treatment facility to 30 mgd AWT. A copy of my testamony given at that meeting is enclosed.

I request that all the questions asked in my testimony specifically be addressed in the final EIS on Piscataway, and I further request that my testimony, all nine pages of it, be included in full in the next and all further EIS's on Piscataway.

Thank you very much for your interest and efforts in this regard.

Sincerely,

Gordon Wood Anderson

Gordon Wood Anderson

Testimony given by Gordon Wood Anderson on March 7, 1974, with regard to the Draft Environmental Impact Statement, "Upgrading and Expansion of the WSSC Piscataway Wastewater Treatment Facility to 30 MGD AWT," prepared by the U.S. Environmental Protection Agency, December, 1973.

Because the Draft Environmental Impact Statement (EIS) on the Upgrading and Expansion of the Piscataway Wastewater Facility is deficient in many respects, some of which were detailed in testimony given at Oxon Hill High School on March 7, 1974, it is important that these deficiencies be addressed in the final EIS. In particular the alternative of land based wastewater disposal systems was insufficiently discussed in the draft EIS, and it is requested that the Environmental Protection Agency (EPA) answer the following questions in the final EIS.

1. It is now national policy by law to encourage waste treatment management which leads to, first, the recycling of potential sewage pollutants through agriculture, silviculture, or aquaculture products, second, the confined and contained disposal of pollutants not recycled, third, the reclamation of waste water, and, fourth, the disposal of sludge in a manner which will not result in environmental hazards.[10] Why has the EPA disregarded national policy in the draft EIS on Piscataway?

2. A recent EPA study on land application of wastewater included the following conclusions.[21] First, land application of wastewaters is practiced successfully and extensively in the United States and in many countries throughout the world. Facilities handled from less than 0.5 mgd to more than 570 mgd. Second, land application of wastewater is a workable alternative to advanced or tertiary treatment of municipal wastes under proper conditions. Third, observations and surveys of land systems did not reveal the existence of specific health hazards. Why has the EPA neglected these findings of its own agency's studies on land treatment of sewage in the draft EIS on Piscataway?

3. Estimates for metropolitan Chicago, which disposes of about four times as much sewage as metropolitan Washington, state that land system capital costs would be between 50% and 67% of those of an advanced waste treatment (AWT) system and that operating costs would be less than 50% of those of a AWT system.[11] Why are the projected EPA cost estimates in the EIS on Piscataway so different from other much more thorough studies?

4. It is possible to use the existing secondary treatment facilities at Piscataway in a modern land based sewage treatment facility. Why has the EPA disregarded this alternative in the EIS on Piscataway and suggested instead AWT facilities which almost certainly will be more expensive in terms of capital and operating costs?

5. Why has the EPA limited land cost estimates to Prince Georges County in the EIS on Piscataway when a regional plan is needed for the entire area in and surrounding metropolitan Washington?

6. Crop rotation on enough land, slow rates of use of the land, and allowing the land to be fallow part of the time have successfully dealt with land contamination problems in land based sewage systems. Why has the EPA neglected this fact and the wide literature available on the subject in the EIS on Piscataway?

7. The EPA report cited above stated that observation and surveys of land based sewage treatment systems revealed the existence of no specific health hazards.[21] Why has the EPA neglected its own sponsored work on disease with regard to alternatives to AWT in the EIS on Piscataway particularly when sewage incineration is known to present serious health hazards?

8. Capital cost estimates for AWT in Montgomery County, Maryland, are now reported to be considerably higher than those stated for Piscataway. Why has the EPA neglected this matter in determining the capital costs in the EIS on Piscataway?

9. Modern land based sewage treatment systems can generate income covering much or most of their operating costs.[5] Why has the EPA neglected this matter in determining operating costs in the EIS on Piscataway?

Land Based Sewage Treatment Systems

Fortunately, there are alternative methods to incineration of sludge for final disposal. The Department of Defense, in fact, has been working very hard on two methods. The Navy is developing the wet air oxidization process, a closed system in which complete combustion occurs and from which there is no gaseous effluent.[1-3] The Army, through the Army Corps of Engineers, is developing land based disposal systems for over twenty cities in the United States, some larger and some smaller than the District of Columbia area.[4-6] 'Many cities such as Chicago and Muskegon on their own are building or upgrading successful land based sewage disposal systems.[5,7-9] Moreover, it is now national policy by law to encourage waste treatment management by the recycling of potential sewage pollutants through the production of agriculture, silviculture, and aquaculture products and by reclamation of waste water as stated in the Federal Water Pollution Control Act Vander Jagt Amendmemt.[10] Land based sewage disposal and nutrient reclamation are discussed below as the main alternative method to sewage incineration.

The land successfully acts as a natural filter for waste products and has done so for as long as life existed on the earth. Moreover, man has traditionally used the land as the area for disposing of his waste for centuries, and many large metropolitan areas such as Melbourn, Australia, have used land based systems for as long as a century.[11-13] The principle involved today is that man can no longer economically or ecologically afford to waste his resources. We must reclaim what we use. It is fine for the farmer to loan the nutrients of his soil to his urban brothers, but he must insist that the nutrients are loaned and not given. Rather than simply throwing them away into a stream or burning them into the air, people in urban areas then must process their wastes in such a manner that the farmer can reclaim his nutrients for producing more food for all people. Thus, one objective of the Vander Jagt amendment to the Federal Water Pollution Control Act[10] would be carried out by shifting our methods from wasteful disposal to reutilization in treating human wastes as displaced resources.

The Vander Jagt amendment[10] does two more things.[5] First, it places the management of these human wastes or misplaced resources on a multipurpose basis. In the use of land based systems, fertilizer is contributed to agriculture, silviculture, and aquaculture, constructive use is made of thermal discharges from electric power plants built at the lagoons in the systems, and outdoor recreation areas are developed in the systems. Second, wastewater management thus becomes a revenue creating process permitting regional governmental agencies to develop and finance other environmental restoration projects.

Modern land based sewage disposal systems are tertiary treatment systems. Primary and secondary treatment, which are all that many municipalities do with their waste at best, are carried out as in many, ordinary sewage treatment plants, though modern designs[5] include secondary treated waste storage facilities so that the land is not used in weather discouraging continuous irrigation. The secondary treated liquid effluent is then used for irrigation on farm or forest lands which act as a natural filter as they always have historically. This is the heart of the tertiary treatment, and the nutrients are thus returned to the land. Moreover, viruses are effectively decomposed into protein in most soils including those that are sandy. Three irrigation methods, spray irrigation, flooding, and ridge and furrow, are in use. Solid wastes which settle out of the liquid in the secondary treatment process can be held in the settling ponds for a year to insure complete biological decay and then marketed as a further source of nutrients for agriculture.[5]

Methods of transporting the liquid waste to the agricultural areas are necessary. These include truck, rail, water, and pumping. The cheapest method is pumping for all distances.[14]

Provision must be made for drainage and discharge after the water passes through the land filter by separating the irrigation areas by forest areas with deep rooted trees or open areas which both further filter and purify the water run off and also can be used as recreation areas for camping and hiking.[14] In the Muskegon system wells have been placed in the perimeter areas to continuously monitor the ground water. Because the ground water moves very slowly, 36 feet per year, there is ample time to correct the problem if contamination is found. A series of reservoirs along the streams and recycling systems are planned in part of Chicago's land based system.[16] In the event that any pollution is detected by the monitoring system, all the water passing through the natural filter is then recycled so that only clean water is passed on to the watershed.

The cost of all good sewage systems is high. The upgrading of the Blue Plains plant alone will cost about half a billion dollars not including the costs of several other new incinerating treatment plants planned for the Washington area. Thorough cost analyses for a land based system for the metropolitan Washington area have not been done, though an estimate of one billion dollars was made by the Environmental Protection Agency.[17]

Better comparisons are available for other cities. Estimates for Metropolitan Chicago, which disposes of four times as much sewage as Metropolitan Washington, state that capital costs of land treatment systems are 67% to 50% of the cost of an AWT incinerating system and operating costs are less than 50% of those of an AWT system.[4]

Moreover, land based systems can produce revenue from increased crop yield, solid waste yield, and industrial sites such as power plants. It has been estimated that if land treatment systems are adopted nationally for 145 million urban residents the revenue from these sources will be about ninety-five percent of operating costs.[5] That is, land based systems essentially pay for their own operation from their revenue.

The objection has been raised that there is not enough available land in the Washington area for a good land based system. 100,000 acres, or an area about the size of the District of Columbia, Arlington and Alexandria combined, would be needed but not all in one place. Several smaller locations would be equally good. Moreover, preliminary studies show that sufficient land with suitable soil is available.[18,19] The ideal situation is to return the treated sewage water to the same major river basin of the area.

A further objection which has been raised is that matter such as heavy metals would be harmful to the soil. This is an important question and needs careful consideration as the nature of the soil is changed somewhat in land based systems. It is critical that enough land be set aside for the purpose, that the rate of use of the land be slow, and that each part of the land be fallow part of the time. It is important to note, however, that all growing plants need some metals and reject other metals and that the type of plant grown on a given area can be changed to use different metals in a desirable manner. Recent studies indicate that the problem is manageable.[20]

A final major, little discussed advantage of land based systems is the green areas they provide and conserve in and near metropolitan areas. By interspersing areas permanently reserved for farms and forests in the midst of our metropolitan areas, we can guarantee ourselves open space reasonably near our homes. Many of us find openess very attractive, and land based sewage treatment systems as well as being safe and economically sound can thus enhance the quality of life for millions of people.

1. R. D. Ross in *Industrial Pollution Control Handbook*, ed. by M. F. Lund (McGraw-Hill, New York, 1971) p. 7-31.

2. *Chemical Engineering*, Oct. 14, 1968, p. 116.

3. M. M. Goodwin, private communication.

4. "Regional Wastewater Management Systems for the Chicago Metropolitan Area," DAEN-CWP, Summary Report, Office of the Chief of Engineers, U. S. Army Corps of Engineers, March, 1972.

5. J. R. Schaeffer, Depaul Law Review 21, 987 (1972).

6. C. M. Driver, B. F. Mrutfiord, D. E. Spyridakis, E. B. Welch, and D. D. Wooldridge, "Assessment of the Effectiveness and Effects of Land Disposal Methodologies of Waste Water Management," Final Report Contract Nos. DACW 73-73-C-0041 through 0043, Office of the Chief of Engineers, U. S. Army Corps of Engineers, January, 1972.

7. F. E. Dalton, J. E. Stein, and B. T. Lynam, J. Water Pollution Control 40, Part I, 789 (1968).

8. B. A. Rose, Water and Sewage Works, Sept., 1968.

9. "The Prarie Plan," Metropolitan Sanitary District of Greater Chicago, April, 1971.

10. Federal Water Pollution Control Act Amendment of 1972, Pub. L 92-500, 86 Stat. 833.

11. A. Khin and G. W. Leeper, Agrochim. 4, 246 (1960).

12. C. H. Williams and J. R. Simpson, Aust. J. Agri. Res. 16, 413 (1965).

13. R. W. Heil and T. Grabacki, J. Water Pollution Control 40 Part I, 801 (1968).

14. "Utilization of Liquid Fertilizer" in "The Beneficial Utilization of Liquid Fertilizer on Land," prepared by Engineering Department, Metropolitan Sanitary District of Greater Chicago (1970).

15. "The Basin Plan" in "The Beneficial Utilization of Liquid Fertilizer on Land," op. cit.

16. "The Prarie Plan," Metropolitan Sanitary District of Greater Chicago, April, 1971, p. 4.

17. "District of Columbia Water Pollution Control Plant," Draft Environmental Impact Statement, Environmental Protection Agency, Middle Atlantic Region, April, 1972.

18. J. Hackett, communication to J. R. Schaeffer, Office of the Secretary of the Army.

19. R. R. Parizek, L. T. Kardos, W. E. Sopper, E. A. Myers, D. E. Davis, M. A. Farrell, J. B. Nesbiff, Pennsylvania State University Studies No. 23, 1967.

20. G. W. Leeper, "Reactions of Heavy Metals with Soils with Special Regard to Their Application in Sewage Wastes," under contract DACW73-73-C-0026, Office of the Chief of Engineers, U. S. Army Corps of Engineers, November, 1972.

21. R. H. Sullivan, M. M. Cohn, and S. S. Baxter, "Survey of Facilities Using Land Application of Wastewater," United States Environmental Protection Agency Report EPA-430/9-73-006, July, 1973.

Response: Dr. Gordon Wood Anderson

①

P.L. 92-500 does require EPA to encourage land treatment of sewage effluent and not to recommend land treatment in all treatment applications. The EIS has been revised to include more discussion of these concerns.

②

EPA has not neglected findings of various studies; however, land treatment does have its limitations and in the Piscataway area the major limitations are the soils and high water tables. EPA-430/9-73-006, "Survey of Facilities Using Land Application of Wastewater", conclusion number 21 states:

> "Observations in the field and surveys of land application systems did not reveal the existence of specific health hazards..."

It should also be noted that conclusion 21 went on to say:

> "While the current studies did not disclose cause for such concerns, the bibliographic abstracts prepared as an integral part of this investigative project do include references describing possible health hazards which warrant further study and these potential problem areas should certainly not be ignored."

Conclusion number 15 of the same report states:

> "Monitoring of land application facilities and effects has been minimal and mostly inadequate."

Recommendation number 2 of the same report states:

> "Land application must not be considered as a panacea or universal method of treatment."

A potential health hazard does exist and until this hazard is adequately defined, considerable care should be taken.

③

The cost analysis has been revised.

④

EPA has analyzed the alternative in the Final EIS.

⑤

This EIS is limited to the proposed 30 mgd AWT additions and effluent discharge pipe.

⑥

EPA has not neglected these studies.

⑦

See #2.

⑧

To date, EPA has not analyzed the cost estimates for the proposed Montgomery County facility. It should be noted that the secondary treatment facilities at Piscataway have already been constructed, while the Montgomery County plan will require construction of an entirely new facility.

⑨

No estimates of revenues generated by the land wastewater treatment alternative at Piscataway were developed because no adequate land wastewater treatment sites were available.

CONCERN

Inc.

March 27, 1974

Mr. Robert J. Blanco, P.E.
Chief, Environmental Impact Branch
U.S. Environmental Protection Agency
6th and Walnut Streets,
Philadelphia, Pennsylvania 19106

RE: Comments on Draft Environmental Impact Statement for the proposed upgrading and expansion of the Piscataway Wastewater Treatment Facility to 30 MGD AWT.

Dear Mr. Blanco:

Concern, Inc., is a national environmental organization which researches and publishes tips to consumers on how to protect the environment. We are enclosing copies of several of our Eco-Tips. You will note in Eco-Tips #2 that we encourage motorists to reduce the amount of lead in the atmosphere by buying the lowest octane, lowest lead gasoline their cars can use without knocking.

We are also enclosing a Position Paper on Lead and our statement to EPA on its proposed reductions of lead in gasoline, as announced in The Federal Register January 10, 1973. We feel that the final regulations issued by EPA are bare minimum restrictions on the amount of lead emitted into the air from gasoline additives.

Concern, Inc., also co-sponsored a Conference on Lead Poisoning in November, 1973, at which many sources of lead contamination were discussed. [see enclosed program]

Since we at Concern have worked hard to try to insure that airborne lead levels, with their attendant health hazards, would be reduced wherever possible, we were distressed to learn that the proposed incineration of sewage sludge at the Piscataway Plant will emit considerable additional amounts of lead into the atmosphere. Our comments on The Draft Environmental Impact Statement will deal only with the lead question. It is our belief that The Draft Statement has not dealt adequately with the lead hazards associated with the incineration of sludge.

2233 Wisconsin Avenue, Northwest, Washington, D.C. 20007, 202/965-0066

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Background Levels

Any attempt to determine a "safe" level of lead emissions from the Piscataway incinerator must take into account the background levels of lead in that area. The Draft Statement is woefully inadequate in this regard. It mentions on B4 that "any existing ambient levels of mercury or lead from other sources, natural or man-made, must be added to the values given here to find the total amounts of these metals in the air," but then goes on to say that there are "no measurements of the ambient levels of lead near the incinerator location." (B5) Why have these measurements not been made? Figures are given for ambient levels of lead in urban Washington and Baltimore and rural Maryland and a guess is made that the Piscataway Incinerator "probably" has levels falling between the urban and rural figures. Why should this be a matter of guesswork? The figures that are used, in any case, only reflect measurements made in 1968 and 1969. Since the levels increased in 1969 over those in 1968, one could assume that the 1974 levels would probably be considerably higher than 1969; this calls into question even further the usefulness of these figures.

What is needed is an up-to-date study on the levels of lead that now exist in the area of the incinerator, and particularly in those populated areas downwind of the incinerator. Studies should be made not only of ambient levels of lead in the air, but also of lead fallout in the dirt and dust in these areas. It is now known that a child can ingest potentially harmful amounts of lead by playing in the dirt and dust around his house or perhaps dropping a lollipop or other food in the dirt and then eating it. Until studies on background levels of lead in air and in dirt and dust are done, it is extremely hazardous to state with any assurance that a child will not be harmed by the additional 4.8 tons of lead that the incinerator will emit during the year. ①

Average Concentrations of Lead

The projected dispersal of these 4.8 tons of lead per year has also been dealt with inadequately, in our opinion. The Statement points out that the concentrations of lead arrived at (6.4 ug/m^3 close to the incinerator; less than 2 ug/m^3 outside a .15 km radius) are averages based on 5 years of meteorological data. But an unseasonal wind, or certain other meteorological conditions could cause far heavier concentrations over short periods of time in certain areas. If a child is exposed to high concentrations of ambient lead on certain days, and is further exposed to the lead fallout in dust and dirt on additional days, his chances of absorbing harmful amounts of lead are increased. And even if he is some distance from the incinerator, could not dirt and dust from the

② heavily contaminated incinerator area under certain conditions, be blown into his area, and cause a direct hazard?

③ Mr. James Repace, a physicist at the Naval Research Laboratory, has done his own determinations of the potential health hazards of 4.8 tons of lead emissions per year. His figures are quite different from those in the Draft Statement, and he predicts that the limit for allowable lead concentrations per year could be exceeded in as little as 8 days under certain conditions. Surely further studies are needed on this very serious issue.

Further Studies

Further studies are needed on other related issues. According to the Draft Statement, page 8, at the present time "there are no standards for the emissions of lead from stationary sources."

④ We understand that further studies are presently being made into the range and toxicity of particulates and heavy metals both by EPA and Batelle Institute, and would assume that standards for these emissions will soon be set, based on the results of these studies. At the time these standards are set, we assume that background levels will be taken into consideration in regulating the amount of toxic metals, specifically lead, that are allowed to be emitted.

⑤ The EPA in the case of the Piscataway Sludge Incinerator, seems to be ignoring the health risks to the people living in the vicinity by proceeding with the test burning of sludge. The people in the vicinity of this incinerator deserve assurance that there will be no burning until there is verification that potential health hazards from submicron particulates do not exist. Too many times in the past because of inadequate pre-testing, especially of chemicals, people have been unintentionally used as quinea pigs, often with extremely serious consequences.

⑥ If test burning is essential, we feel that EPA should make every effort to insure that the health of the people living near this incinerator is protected and that alternative means of disposing of this sludge are thoroughly investigated before regular burning is carried on at Piscataway.

Alternative Methods of Disposal

The section on possible alternatives to incineration needs to be greatly expanded. Pyrolysis, for example, according to the Draft Statement (H5) "has the potential of eliminating air pollution and producing a useful byproduct." And yet this method appears to be summarily dismissed: "Application of this process has been limited and is therefore still being evaluated."

If, in fact, pyrolysis can eliminate health hazards it should be seriously considered as an alternative to incineration. By-products of the pyrolysis of carbonaceous materials can include gas and oil. In a time of fuel shortage, and the concomitant worry about the availability of oil for firing incinerators, does it not make sense to consider a system that recaptures valuable fuel resources?

⑦ If pyrolysis had been seriously considered as an alternative method of disposal before the incinerator plant was built, the Draft Statement should indicate this, and should state the reasons why it was discarded as an alternative. Clearly, since an incinerator has already been built, there will be an attempt to justify its use. One wonders however, if existing incinerators could be converted into use as pyrolytic units if pyrolysis is demonstrated as a more desirable method of disposal.

⑧ Another method of disposal that has been suggested is to ship the sludge on empty coal cars back to mining areas where it could be used to help reclaim and restructure the land. This alternative was not mentioned in the Draft Statement.

⑨ And surely further attention should be given to the possible use of sewage sludge as a fertilizer and soil conditioner. Since fertilizers are now in short supply throughout the world, this alternative method deserves careful consideration. The Draft Statement claims that it "has proved to be uneconomical" in many cities, but the fact that it has been successful in Milwaukee is of equal significance. The values of reusing the wastes of our society, and of providing the soil with nutrients it might not otherwise get, may even justify a higher cost of sludge disposal, if indeed a careful analysis indicates that disposing of sludge as a soil conditioner or fertilizer is more costly. We urge that much more careful consideration be given to this method of disposal.

We hope to see the EPA take a responsible position in this matter.

Sincerely yours,

Nancy W. Ignatius

Nancy W. Ignatius,
President

Enclosures

[illegible]

CONCERN

Inc.

POSITION PAPER ON AIRBORNE LEAD

Lead has long been recognized as toxic to human beings. Since no biologically useful function in human metabolism has ever been demonstrated for lead, prudence would seem to dictate that all known sources of lead contamination be controlled to the greatest extent possible.

Cases of acute lead poisoning are well known and have been documented in medical literature. "Lead poisoning in children is known to result in death. In survivors, mental retardation, cerebral palsy, convulsive disorders, blindness, learning disabilities, behavior problems, renal problems and other sequelae may occur." (Dr. Jane Lin-fu, in testimony to Congress, May 8, 1972) Acute symptoms of this type are usually associated with blood lead levels above 40 micrograms per 100 milliliters of blood (40ug/100ml.), and have usually been thought to be the result of the ingestion of leaded paint chips from the walls of old houses.

However, some evidence has come to light recently indicating that peeling paint is not always implicated in cases of lead poisoning. Dr. Bonnie Peacock wrote, in a letter to Dr. Michael Prival dated July 13, 1972: "Since we started our routine screening program it is becoming evident that many children with elevated blood lead levels, greater than 40 mcg. per 100 ml. of blood have no history of eating peeling paint and plaster."

Similarly, a statement of Dr. Jane Lin-fu in her testimony before Congress, indicates that "careful examination of the literature reveals that a history of pica and paint or lead-paint plaster ingestion is not invariably elicited in children suffering from lead poisoning or who show evidence of undue lead exposure. Among 1,155 children treated in Chicago for lead poisoning between 1967-1968, only 901, or 78 percent, gave a positive history of pica in relation to paint or lead-paint plaster. Although deliberate denial by some parents and failure of others to observe such ingestion probably account for the negative history in some cases, other sources of undue exposure cannot be ruled out in many."

Dr. Lin-fu repeats this evidence in an article in Children Today, Jan.-Feb., 1973 and adds that "analysis of paint in houses of children with lead poisoning has not consistently revealed the presence of lead paint. New York City, for example, reported that

[illegible] Wisconsin Avenue, Northwest, Washington, D.C. 20007, 202, [illegible]

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in 1971 a potential source of lead was uncovered in only 76.3 percent of the paint samples obtained from apartments in which children with lead poisoning lived. The negative results may to some extent reflect a sampling problem, but again other hazardous sources of exposure must be considered.

"Among the many potential sources of hazardous lead exposure for children are airborne lead and lead fallout in street dust and soil. Recent studies reveal an extremely high lead content in street dust and surface soil in some areas. For example, street sweeping in New York City yielded 2,650ug lead/gm of dirt while surface soil in MacArthur Park in Los Angeles was found to contain over 3,000ug lead/gm. The lead content of 1 gm. of such dirt (roughly 1/2 to 1/4 teaspoon) is approximately 9 to 10 times the maximum daily permissible intake of lead in young children." (p.5,6)

While a National Academy of Sciences report entitled "Airborne Lead in Perspective" states that "the direct ingestion of lead pigment paints is clearly the principal environmental source in cases of severe lead poisoning in young children," (p.140), the report also notes: "It may be estimated that dustfall from airborne lead, if swallowed, can make a significant contribution to a small child's total lead intake and thereby contribute to the occurrence of lead poisoning, especially in urban areas." (p.140)

The EPA report on "Health Effects of Airborne Lead" refers to a study of 230 rural children and 272 children from an urban poverty area. "Nearly all of the rural children with excessive lead body burdens lived in homes containing at least one surface with 1% lead paint or greater. However, this paint hazard could be found on accessible indoor and exterior surfaces in homes of only 60% of the urban children found to have excessive lead exposure. These findings are consistent with the position that excessive lead exposure of young children in urban areas is caused not only by lead in paint, but also by lead in air, in dust, and in dirt." (EPA A-21)

The EPA study also reports that children living near a lead smelter in El Paso, Texas, were found to have abnormally high blood lead levels although peeling paint was not a problem. "The fact that a larger percentage of 1-5 year old children (89.2%) had abnormally elevated blood leads compared to 6-17 year olds (64.7%) suggests that combined exposure to airborne lead as well as ingestion of lead contaminated dusts was contributing significantly to this problem in the group most likely to ingest non-food items, the 1-5 year olds." (A-23)

EPA summarizes its own position on the question of lead fallout in dust and dirt: "If paint containing less than 1% can contribute significantly to abnormally elevated blood levels and even to lead poisoning, then the potential contribution to this problem of dust and dirt containing similar quantities of lead cannot be ignored.

"Although lead paint and lead in dust and dirt may not always be equally absorbed from the gastrointestinal tract, current levels of lead in street dust and dirt are considerably higher than that recommended as a safe level of lead in paint. Lead in dust and dirt would pose an additional hazard to a child already exposed to peeling lead based paint. Reduction of airborne lead levels for purposes of decreasing the concentration of lead found in urban dust and dirt would thus be a prudent decision." (EPA Study A-25,26)

The studies quoted above refer to the possible role played by airborne lead and lead in dust and dirt in cases of acute lead poisoning or abnormally elevated blood lead levels (above 40ug/100ml.).

Recent literature, however, has begun to examine the possibility of physical impairment in individuals who are repeatedly exposed to low levels of lead contamination.

A study done by Dr. Paul Craig of The Environmental Defense Fund and submitted to Gov. Rockefeller of New York in November, 1970, states: "Low level exposure to lead is known to produce biochemical changes in man. A negative correlation between blood lead level and delta-amino-levulinic acid dehydrase [ALAD] (an enzyme involved in hemoglobin synthesis) has been found in healthy males with no known occupational exposure to lead. Blood lead levels were in the range of 5 to 33ug pb/100ml. blood. (Craig p.4)

A more recent EDF paper repeats this concern over biochemical changes at low levels of exposure citing the EPA study. "A measurable biochemical effect (ALAD depression) is associated with blood lead levels which are typical of Americans." While it is not yet known whether this causes health impairment in humans, "in animals, such depression of ALAD activity in the serum is correlated with similar inhibition of the brain enzyme." (Adamson, p.2)

The NAS study reiterates that there is no direct evidence at present of impairment of normal hemoglobin because of ALAD depression but goes on to say: "Nonetheless, this action must be viewed as undesirable, in that it does represent an interference with the availability of an essential metabolite required for normal body function, which in some circumstances might prove deleterious." (NAS p.208)

The NAS study goes on to suggest other possible detrimental effects due to protracted lead exposure at low levels. "The subtle effects of behavior of low lead exposure of long duration may be manifest in two types of disorders: the dulling of mentation and chronic hyperkinesis. No information is available regarding the possibility of cause and effect in what may be an extremely important problem." (NAS p.208)

In this connection, a recent study published in Lancet, and cited by Louis Slesin in a draft report for Natural Resources Defense Council, reports that "raised levels of lead (not necessarily in the toxic range) present over a long period could be responsible for the minimal brain damage that may be present in the hyperactive syndrome." (Slesin p.7)

In addition to this possible connection between continued exposure to lead and hyperkinetic activity, preliminary studies have shown that certain other health effects may also be related to lead.

The EPA study reports that chromosomal abnormalities were found in 13 out of 15 randomly selected individuals living near a lead smelter, who had been exposed to high concentrations of lead. EPA goes on to say: "We do not know whether these effects are associated with low level chronic lead exposures among the general population. Although these studies are not by themselves conclusive, they indicate that we should be concerned about possible genetic implications resulting from general population exposures to lead." (EPA III-3)

Dr. Lucile Adamson, in her comments to EPA's proposed regulations on limiting the amount of lead in gasoline points out an additional health hazard that EPA has overlooked. "One of the most serious considerations overlooked in the EPA study is the evidence that, in animals, lead exposure too low to cause other symptoms of lead intoxication causes profound depression of the resistance of animals to infection." She then cites several studies in which test animals, exposed to low doses of lead, showed increased mortality rates due to susceptibility to infection. She concludes "The experimental impairment by lead of the ability to resist bacterial infection occurs after lead doses which approximate, on a body weight basis or on the basis of organ lead concentrations, the present average body lead burden in Americans, and it occurs at lead exposure levels which are not accompanied by other overt signs of lead poisoning...These body lead burdens could well be causing decreases in general resistance to infection of the human population without the effect being noticed." (Adamson Comments to Ruckelshaus, p.6) (See also Adamson, "The Effect of Lead on Susceptibility to Infection")

Lucile Adamson also mentions studies being done at the Staten Island Zoo where several animals have died of lead poisoning and others have become ill. "The investigators tentatively concluded that 'most of the lead taken in by the animals resulted from atmospheric fallout.'" (Adamson Comments p.8)

Concern has been in touch with Dr. Dennis Craston, toxicologist with the New York City Medical Examiner's Office, who tested the animals and found high concentrations of lead and zinc in hair, blood and feces. Dr. Craston stated in a telephone conversation that he believed fallout from airborne lead was the principal cause of the death of the animals and that he was working on further studies implicating airborne lead and would send copies to Concern when they were available.

Most of the literature on the subject of lead contamination from airborne sources is necessarily cautious. Because exact cause and effect relationships are difficult to establish, interested groups such as the Lead Industries Association and the American Petroleum Institute have criticized the EPA study. The American Petroleum Institute claims that "no proof exists to brand airborne lead a health hazard." (Air Water Pollution Report, March 19, 1973, p.116) The International Lead Zinc Research Organization, Inc.has published a study claiming to show that the "removal of lead from gasoline would have no impact on the blood levels of the population." (AWPR, April 2, 1973, p. 136) Concern has asked for a copy of this document and will study its findings.

It is worth noting, however, that blood lead levels are indeed up. An alarming 52% of the children screened at Child Health Center Clinic in June-September, 1972 showed blood lead levels greater than 40ug/100ml. blood. Since these children live in areas of high traffic density, and thus are exposed to lead fallout from automobile emissions, one must assume that this is a factor that needs to be taken into account.

The March 1, 1973 issue of The New England Journal of Medecine sees a clear relationship between airborne lead and elevated blood lead levels, pointing out that "numerous studies have established that exposure to airborne lead is reflected in an increased body burden. Blood lead levels of parking-lot attendants, traffic policemen, and tunnel employees are substantially higher than those of workers in occupátions with less exposure to airborne lead. Urban Philadelphians have twice the blood lead levels of their suburban, noncommuting neighbors. Housewives who live within 3.7 meters (12 feet) of a heavily traveled roadway have substantially higher blood lead levels than women living at distances greater than 38 meters (125 feet). Children attending school 0.3 km (0.2 mile) from a lead smelting plant are reported to have significantly higher blood lead values than a similar group whose school is 1.1 km (0.7 mile) from the source. Levels of lead in deciduous teeth, a cumulative index of exposure, are 5 times higher in ghetto children than those found in suburban children. Children living in suburban Boston have concentrations of lead in their teeth that are twice those of Icelandic children." (N.E. Journal p. 466)

While these examples do not constitute direct cause and effect evidence of the role played by airborne lead in clinical and sub-clinical lead poisoning, they are certainly suggestive of a widespread and increasing health problem due to lead contamination. Further studies obviously must be done, but a sensible society will not wait until all the results are in before taking steps to halt the continued injection into its environment of a known toxic element. As the N.E. Journal of Medicine states it: "The experience with black-lung disease and the delayed effects of asbestos exposure demonstrates that by the time epidemiologic methods certify to the satisfaction of regulatory agencies that an agent is toxic, large numbers of people have paid the cost of avoidable exposure. It should not be necessary to repeat this experience with lead.

"Enough data are at hand to establish that this metal, of known toxicity, is being issued into the human environment in amounts associated with hazard. Prudence will dictate that the necessary steps be taken to remove it without delay from all contaminating sources, including gasoline." (N.E. Journal, p. 467)

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CONCERN

Inc.

March 8, 1973

Honorable William D. Ruckelshaus
Administrator
Environmental Protection Agency
Room 3902, Waterside Mall
4th and M Streets, S.W.
Washington, D.C. 20460

Dear Mr. Ruckelshaus,

We would like to restate the position of Concern, Inc. on the EPA proposal calling for a phased reduction of lead in gasoline. We are responding to the announcement which appeared in The Federal Register of January 10, 1973.

We have carefully studied the recent report prepared by your office dated November 29, 1972, entitled "EPA's Position on the Health Effects of Airborne Lead", and are interested in the statement in Section VII-5 under Recommendations which says:

> These results cast doubt on the adequacy of the previous position taken by EPA that achievement of a 2ug/m^3 air lead goal would assure a reasonably complete degree of public health protection.

We assume that the goal of 2ug/m^3 was the basis on which the proposed regulations of February, 1972, were formulated. If EPA now believes that the standard of 2ug/m^3 is inadequate to protect the public health, one would expect that the new proposed regulations would call for a greater reduction of lead in gasoline, to be accomplished in a shorter time. Instead, we find to our surprise, that the proposed regulations of January 10th not only do not call for a further reduction of lead in gasoline, but actually postpone the date on which the former inadequate reductions were scheduled to begin. This seems inconsistent to us with EPA's own stated conclusion that "every effort should, therefore, be made to reduce all preventable lead exposure, including airborne lead, to the fullest extent possible."

We would like to reiterate our position on the question

2233 Wisconsin Avenue, Northwest, Washington, D.C. 20007, 202/965-0066

Board of Directors
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of lead in gasoline. As you may know, we at Concern have taken a great deal of interest in the health hazards of lead in gasoline. In our Eco-Tips #2, published in February, 1971, we urged individuals to take whatever steps they could to reduce the amount of lead being released into the air. We advised the motorist to buy gasoline of the lowest octane rating and the lowest lead content his engine could use without knocking. Our hope was that this interim measure would help alleviate the buildup of lead in our air until such time as the EPA would order removal of all lead from gasoline.

But we find from your new proposed regulations (as well as the regulations proposed last February) that EPA is not ordering the total removal of lead. The proposed reduction to 2 grams of lead per gallon by 1975 and to 1.25 grams of lead per gallon by 1978 seems to us to be totally inadequate. Right now, low-lead gasolines that contain only about .5 gram of lead per gallon, are generally available to the motorist. These low-lead gasolines are adequate for many older cars on the road that need some boost in octane. Two grams of lead per gallon seems excessive for these cars.

For those older cars that need higher octane levels, we suggest that EPA propose that high octane unleaded gas be made generally available. We recognize that there may be concern about the possible health hazards of polynuclear aromatics in high octane unleaded gas but find both Dr. Albert Fritsch's studies on this subject and the statements of the Department of Commerce that PNA's from automobile emissions are not a major health hazard persuasive on this issue. We are further heartened by your own statement in the Federal Register of January 10th that "The lead reductions required by these regulations and the lead reductions resulting from the general availability of lead-free gasoline will not cause an increase in other harmful emissions."

Since lead is already known to be a health hazard, particularly for inner city residents, we would like to see as much lead as possible removed from the environment as soon as possible. We would hope that a schedule could be devised which would cut the allowable amount of lead to .5 gram per gallon by 1974 and which would phase out lead entirely by 1977 (or better yet by 1976 in time for the Bicentennial celebration!).

If you have any questions, please feel free to call us.

Yours sincerely,

Nancy W. Ignatius

Mrs. Paul Ignatius

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Response: Concern, Inc.

①

EPA fully appreciates the need to supplement its tentative conclusions regarding the potential health effects of the Piscataway incinerators. For this purpose, the University of Maryland and Battelle-Columbus Laboratories will undertake, respectively, studies on ambient air quality and incinerator emissions and performance. The incinerators will not be allowed to operate routinely until EPA is convinced that they will not present a hazard.

②

EPA does not have any expectation that the incinerator area will ever be "heavily contaminated". We do agree, however, that it is probably not possible to completely avoid the simultaneous occurrence of unlikely circumstances. The testing programs mentioned above will determine the contribution of the incinerators to potentially hazardous conditions.

③

EPA feels that Mr. Repace has greatly overestimated the amount of lead emissions and misunderstood the process of body elimination of lead. See the responses to the two submissions of the Air Pollution Committee.

④

See responses #1 and #24 to "25 Questions". The permit mechanism, moreso than emissions standards, probably offers a more positive approach to coordinating point source emissions with ambient conditions.

⑤

EPA is attempting to balance the needs of learning more about the incinerators' performance while safeguarding area residents. We have concluded that there will be no risk involved in continuing the testing program.

⑥

An irreversible commitment to sludge incineration has not been made. See Sections III.E. and IV.A. above for a discussion of alternatives.

⑦

Although pyrolysis offers considerable promise for the future, limited technology on sludge pyrolysis prevents this process from being seriously considered as a sludge treatment alternative at a major treatment facility. Conversion of the existing incinerators to pyrolysis units is not possible.

⑧

See comment #20 to "25 Questions".

⑨

The land treatment alternative for sludge disposal is being evaluated by EPA and WSSC. The EIS has been revised to indicate this endeavor in light of potential health problems resulting from sludge incinerator emissions.

2430 Mary Place
Oxon Hill, Maryland 20022
April 4, 1974

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APR 8 1974

Director of Public Affairs
EPA, Region III
6th and Walnut St.
Philadelphia, PA 19106

Dear Sir:

I am an ecology teacher in the Prince George's County public school system and participant in the county stream testing program. I have a master's degree in Environmental Biology and currently a member of the Friendly Community Citizens Association.

I have studied the draft of the impact statement on the Piscataway Sewage Treatment Plant (after the public hearing, due to unavailability of copies of the statement) and would like to enter a few comments on the record about the impact statement and the projected use of the plant and incinerator. They are as follows:

1. Use of the incinerator would be diverting pollutants from one area (aquatic ecosystem) to another area (atmosphere), therefore, not solving the pollution problem. ①

2. The impact statement does not consider any alternatives to incineration. ②

3. Number Two fuel oil projected for use by the incinerator will not be available for a long period of time. ③

4. There are no set standards for lead and mercury pollutants released from sludge incinerators. ④

5. It appears this is not a one time expansion, other extensions are indicated by installation of an 108 inch diameter pipe which could handle 350 mgd, not the requested 30 mgd. ⑤

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6. The human factor is considered more than wildlife and asethetics of environment. ⑥

7. Recent testing for lead (since the public hearing) in children in the Piscataway Treatment Plant vicinity indicate high levels of lead concentrations (between 37-45 mg/mm, with 50+ being hazardous). There are strong indications that the lead is coming from the Piscataway Incinerator or other sludge burning units in the area. ⑦

8. There is an indicated bioaccumulation of several heavy metals. ⑧

9. Probably the pollutants might be carried away from this area, but eventually they will fall into water and on the soil in some area. Dispersement of the pollutants is unlikely though with a 60 foot incinerator smoke stack and the surrounding hills having an elevation of 200 feet. ⑨

As a concerned citizen, I feel that sludge incineration at this particular plant should be abandoned and other alternatives should be seriously considered. It is apparent that sludge incineration is hazardous to health and wildlife through bioaccumulation and direct absorption of heavy metals.

Respectfully,

Sharron S. Quisenberry

Sharron S. Quisenberry

Response: Sharron S. Quisenberry

①

The environment is an interrelated closed system in which nothing can be "disposed of" and everything is essentially recycled. It has been modern man's practice to rid himself of his waste in the cheapest (economic) manner possible and, in recent years, in a manner least damaging to the environment. At the time of conception, the proposed project was thought to achieve these goals. Since then, greater emphasis has been placed, and rightfully so, on recycling or re-using waste in the most beneficial manner. However, it has been demonstrated that, under the circumstances, incineration would be the most cost-effective sludge treatment process at Piscataway for 30 mgd AWT. After testing of the incinerators has been completed, EPA will then conclude as to the possible impacts on the public health if the incinerators were operated on a routine basis. (Note: EPA is confident that the operation of the incinerators for testing purposes will not endanger public health.) Depending on the results of these tests, EPA will determine whether or not the incinerators will be approved as the mode of sludge treatment for the proposed project. These results and conclusions will be presented in a Supplement to the Final EIS. It has been emphasized that EPA will not allow the incinerators to operate if they pose a threat to the public health.

②

The Final EIS does consider alternatives to incineration.

③

This concern has been addressed in the Final EIS.

④

EPA standards for mercury emissions from stationary sources are 2300 g/day. Incinerators are not included in these standards, although separate standards for incinerators are expected in the near future. The Piscataway facility will meet the new standard. At present, there are no lead emission standards.

⑤

Any further expansion (beyond 30 mgd) would be subject to a complete NEPA review.

⑥

It is felt that all parameters of the environment have been given proportional and appropriate consideration.

⑦

Quite the contrary. Re-test of the same children have shown no unusual lead concentrations. It is felt that most lead residue (96%) in the D.C. area results from automobile exhausts.

⑧

Heavy metals can and do accumulate. Test results from the incinerators should show the quantity of heavy metal emissions.

⑨

A testing program to include these concerns will be conducted and is outlined in Appendix A.

The Physiological Hazard from Lead Pollution from the WSSC Piscataway Sewage Sludge Incinerator

James L. Repace
Chairman, Air Pollution Committee
Prince Georges Environment Coalition

April 7, 1974

The physiological hazard may be estimated from the lead emission factor given by the EIS, modified by a number of correction factors which take into account the atmospheric dispersion model, the probability of occurence of the atmospheric conditions assumed by the model, and the physiological characteristics of the receptor population. To this must be added the degree of biological harm the pollutant is capable of causing, and the biological half-life of the pollutant.

1. Lead emissions from Piscataway incinerator (as estimated by EPA's Piscataway Environmental Impact Statement (EIS)): 26 lbs/day.*

2. Atmospheric Dispersion Model:

Topography: Incinerator stack altitude 73 feet (EIS plus U.S. Geological Survey Map for Piscataway Quadrangle)

Selected downwind receptor: The Rudd household Piscataway Drive, Oxon Hill, Md. Altitude 110 feet, distance from incinerator 750 meters, bearing NNE. (This is not the closest residence)

Plume Rise: According to the EIS, Aerodynamic downwash of the plume will occur for wind velocities greater than or equal to 1.8 m/s (about 4 mph). Examination of the D.C. Airport Windrose discloses, for the S-SSE wind sector, windspeeds of from 0-4 mph occur with a frequency of about 10%, with dead calm conditions occuring less than 5% of the time. Thus, for 85% of the wind speeds, the plume rise will be dictated by the aerodynamic trajectory across the steeply rising terrain, leading to fumigation of the hillside by the plume.

3. Atmospheric Stability:

: Pasquill-Turner Stability Category "E", Slightly Stable Air (not a worst case) Windspeed 2 m/s, Wind direction S-SSW, Wind frequency 23% (DCA Windrose), Stability Frequency--occurs on 70% of the days (actually a typical night-time condition) (by analogy with National Weather Service Data for Dulles Airport, Sterling Virginia, which is rural like Piscataway, rather than urban, like D.C. Airport)

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*Based on a sludge lead concentration of 327 ppm and an incineration rate of 89000 lbs/day, with a 10% scrubber collection efficiency. (as per EIS)

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4. Pollutant Concentration at Receptor:
"Under conditions of irregular topography, the direct application of a standard dispersion equation is often invalid ... For example, to calculate concentrations on a hillside downwind from and facing the source at about the effective source height, the equation for concentrations at ground level from a ground level source ... would closely approximate the situation under stable conditions, when the pollutant plume would be most likely to encounter the hillside." From D.B. Turner, WORKBOOK OF ATMOSPHERIC DIFFUSION ESTIMATES, EPA, # AP 26, 6th Printing, Jan. 1973, Revised 1970, p. 40. The equation is # 3.4, page 6:

$$X(x,0,0,;0) = Q/\pi\sigma_y\sigma_z u$$

The parameters are:
Emission Factor: $Q_{Pb} = 2.1 \times 10^5$ micrograms/sec @ max.inc. :
windspeed: $u = 2$ m/s
horizontal dispersion coefficient, E stability, $\sigma_y(750m) = 3$
vertical dispersion coefficienct, E stability, $\sigma_z(750m) = 17.$
(dispersion coefficients from Turner Workbook, fig's 3.2,3.
**Note: since the wastewater flows from the "potentially servicable area" were 72 MGD in 1972 (EIS) it is obvious that the incinerators will be operating at capacity.

$$X = 50.26 \text{ micrograms/meter3}$$

is the concentration of lead estimated for the Rudd househo for E stability at 2 m/s. (For the worst case, F stability, the concentration would be 111.78 ug/m^3).

5. Particle size estimation:
The air pollution control equipment on the Piscataway Incinerato 6° is a 40" W.G. pressure drop venturi scrubber. Such a device operates on the principle of inertial impaction, which means that the collection efficiency falls off exponentially with decreasing particle diameter. In fact, curves of average collecti efficiency vs particle size presented in AIR POLLUTION MANUAL, CONTROL EQUIPMENT, Published by American Industrial Hygiene Assn show an extremely rapid falloff below 1 um. Combustion products are known to exist in the particle sizes .001 to .1 um, condense products in the .1 to 1 um range. Therefore we shall assume that the lead is emitted as a distribution centered about .01 um but condenses and is centered about .1 um at the receptor, allo for an aggregation factor of 10.

6. Pulmonary retention efficiency:
.1 um particles are retained in an average human lung with a retention efficiency of 40%. (Task Force on Lung Dynamics: see fig. 9.4, Air Quality Criteria for Particulate Matter, U.S. Dept. H.E.W. Public Health Service Doc. # AP-49)

7. Absorption Efficiency of lead from lungs into bloodstream: 85%
(Dr. Julian Chisholm, Baltimore City Hospital, private comm.)

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8. Blood Volume: We shall assume a 55 lb child, and compute, from the MERCK MANUAL OF DIAGNOSIS AND THERAPY, Ed, D,N. Holvey, MD., Merck & Co., Rahway, N.J. 1972: 25 kg x 70 ml blood/kg body wt. = 1750 ml whole blood.

9. Normal Blood Lead levels: 50 ug/100ml or less, or .5 ug/ml. (Merck Manual, Table 91, p.1826). U.S. Average is 10 ug/100m

10. Biological Half-life: infinite. "Lead is a cumulative poison. Increasing amounts build up in the body and eventually a point is reached where symptoms and disability occur" DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, N.I. Sax, (2nd Ed) Reinhold, 1963.

11. Reppiration rate: 10 meters3/day is a reasonable rate to assume for the child described in line 8 (Dr. Julian Chisholm, Baltimore City Hospital, private communication)

12. Maximum daily blood uptake of lead (before correction factors are applied): (E stability) Assuming the subject is 100% exposed.

50.26 ug/m3 x 10 m3/day = 503 ug/day exposure

503 ug/day/1750 ml blood = .29 ug/ml-day

13. Adjusted daily estimated blood uptake of lead by the 25 kg subject

$$\frac{.29 \text{ ug}}{\text{ml-day}} \times \underset{\text{WIND frequency}}{.23} \times \underset{\text{stability frequency}}{.70} \times \underset{\text{Pulmonary [illegible] efficiency}}{.40} \times \underset{\text{Pulmonary absorption efficiency}}{.85} = 0.016 \text{ ug/ml-day}$$

14. Question: Since the 25 kg subject in the Hudd Household has been observed to have blood lead levels of .45 ug/ml, assuming his basal blood lead level prior to operation of the incinerator was .10 ug/ml, how long would it take the blood lead to increase to .45 assuming the incinerator caused the increase?

.016 ug/ml-day x N days = .35 ug/ml

N = 22 days presuming that the stability condition is prolonged for 24 hours/day. This is unreasonable, therefore let us assume it obtains for only 12 hours/day. Thus

N = 44 days, Where the stability condition is assum to hold during the nighttime hours onl

(N = 59 days at average incineration rates)

15. Thus, we have shown that in just 1½ months time, the incinerator could be expected to expected to cause lead poisoning under conditions far from being worst case. It can be concluded, therefore, that even if the actual measured lead emissions from the incinerator turn out to be 10 times lower that estimated in the impact statement, a normal subject of 25 kg weight would develop abnormal blood lead levels within 1½ years.

16. For the subject discussed here, whose blood lead level is 45 ug/100 ml, in just 7 days* of further operation of this incinerator, his blood lead level would go over into the abnormal range. It is obvious that further operation of the Piscataway sewage sludge incinerator represents a grave health hazard.

17. The above analysis indicates that operation of the WSSC Parkway and Western Branch sewage sludge incinerators must also not be permitted.

James L. Repace
101 Felicia Lane
Bowie, Maryland

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*11 days at average incineration rates at 30 MGD effluent flow.

PRELIMINARY VALUES FOR ATMOSPHERIC LEAD CONCENTRATIONS AT ACCOOKEEK, MARYLAND

J.J. Bors, W.H. Zoller and G.E. Gordon, Dept. of Chemistry,
University of Maryland, College Park, Maryland 20742

The values listed on the attached page were determined by cutting off one-fourth of each 8" x 10" glass-fiber filter, leaching the quarter filters with a 1:1:2 mixture (by volume) of 15M HNO_3, 12M HCl and H_2O, and determining the Pb concentrations of the resulting solutions by atomic absorption relative to solutions containing known concentrations of Pb. For the present, we consider the values preliminary, as we plan to spot-check some of the samples with a second analytical method, probably instrumental photon activation analysis. Lead concentrations in the sludge itself were also determined by atomic absorption.

For comparison with the Accookeek, I have listed below some annual average atmospheric Pb concentrations obtained from EPA's National Air Surveillance Network for 1968. (Private communication from G. G. Akland, EPA.)

Location	Pb conc. ($\mu g/m^3$)	Fe conc. ($\mu g/m^3$)
Washington, D.C.	0.70	1.3
Baltimore, Md.	1.45	3.2
Calvert Co., Md.	0.15	0.6

As can be seen, the Pb concentrations measured at Accookeek are considerably below those observed in Washington and Baltimore and usually not much greater than those observed in Calvert Co. (at Solomon's Island).

PRELIMINARY RESULTS - ACCOOKEEK AIR-FILTER SAMPLES

Sample Date	Sample No.	Volume (m^3)	Wt. of Pb on ½-filter (μg)	Pb conc. (μg/m^3)
1-10-73	003401	2420	150	0.25
2-9-73	003471	2590	211	0.32
3-11-73	003545	2790	71	0.10
4-22-73	003656	2620	78.5	0.12
5-4-73	003681	2830	94	0.13
6-3-73	003751	2800	225	0.32
7-3-73	003835	2870	83.5	0.12
8-8-73	003931	2250	111	0.20
8-26-73	003970	2370	228	0.38
3-24-74	004421	2390	97	0.16
3-27-74	004425	2390	166	0.28

SLUDGE SAMPLES

Sludge Sample	Sample wet Weight	μg Pb	μg Pb / g wet wt.
3-3-74 filter press 1	1.0888	101	93
(3-4-74) S-935	1.0841	82	76
3-5-74	1.0339	92	89

Dry wt/wet weight = 83.5 - 83.83

PRELIMINARY RESULTS - IRON AND CADMIUM IN ACCOKEEK AIR FILTER SAMPLES

Sample Date	Sample Number	Volume (m^3)	$\frac{\mu g\ Fe}{m^3}$	$\frac{\text{nanograms Cd}}{M^3}$
1010-73	003401	2420	0.84	2.1±1.0
2-9-73	003471	2590	0.92	2.8±1.4
3-11-73	003545	2790	0.20	2.6±1.3
4-22-73	003656	2620	0.73	1.4±0.7
5-4-73	003681	2830	0.64	2.3±1.2
6-3-73	003751	2800	0.70	3.0±1.5
7-3-73	003835	2870	0.51	2.4±1.2
8-8-73	003931	2250	0.58	3.7±1.8
8-26-73	003970	2370	0.81	4.0±2.0
3-24-74	004421	2390	0.75	3.0±1.5
3-27-74	004425	2390	--	3.0±1.5

IRON AND CADMIUM IN PISCATAWAY PLANT SLUDGE

Sludge Sample	Sample Wet Weight	Dry Weight (1.5 hrs at 110°C)	% Fe in wet sample	$\frac{\mu g\ Cd}{g \text{ wet sample}}$
3-3-74 filter press 1	1.0888	0.9122	0.79	8.2±0.8
3-4-74 S-935	1.0341	0.9159	0.70	1.9±0.6
3-5-74	1.0339	0.8711	0.80	1.7±0.8

These analyses were done on the same solutions as lead. The elements were leached by refluxing for one hour a 1:1:2 mixture of 15 M HNO_3, 12 M HCl, and H_2O.

Results of Lead Samplings Taken 3/29/74

Sample No.	Description	Results
1.	play area alongside swings (Rudd)	17 ppm.
2.	play area in front of swings (Rudd)	35 ppm.
3.	play area under rear deck (Rudd)	1.6 ppm.
4.	driveway stones in oil spill (Rudd)	463 ppm.
10.	dirt and crayon in vacuum	302 ppm.
S945	Piscataway Creek	<.01 ppm.
S955	Rudd's kitchen tap water	<.01 ppm.

Partial transcript of taped meeting on March 21st 1974 at the P.G. County Courthouse. The meeting was called by Councilwoman Potts for informational purposes. Subject matter was sludge incineration at the Piscataway Waste Water Treatment Plant. One hour prior to the meeting 2 families near the plant got the results of blood lead level tests done at Childrens' Hospital on March 14th. Mrs Palla Wilt went to the meeting to inform all the responsible parties about the alarmingly high lead levels. Others present:

Lucille Potts	P.G. County Council members
Francis White	- - - -
Dr. Perry Stearns	P.G. County Health Dept.
John Koontz	P.G. Ais Pollution Control Div.
Dr. Nachis	WSSC
Walter Klein	-
Dan Geller	Environmental Protection Agency
Bill Colony	- - -

Suddenly confronted with a new reality EPA and others made some startling revelations:

Potts: We have a statement here from Dr. Greene at Childrens' Hospital, because my office called and this was relayed to us, so you are getting it in just a second. He is a very difficult man to get hold of, we have been trying for a week to reach him.

Wilt: Those were not the only children tested. My two children were tested and I was tested also. All of these levels are higher than the normal level. Dr. Greene also said that 59 is the critical point. The Rudd children have a 45, a 43 and a 34. My children have a 39 and a 38 and I have a 37. Dr. Greene also said that this is 3 times the normal amount of lead that you should have in your system at this particular time.

White: About which figure is the normal?

Wilt: He didn't give us a normal, but this is 3 times the normal, he said.

Since it isn't normal, then there must be some reason.

Potts: I was going to ask if there is a way, now you said there are other incinerators in operation, that have never been tested for this. If people in the area of those incinerators could be tested to see, what their blood levels are, then, you know, this is your field, are there people who are not near this to be tested. And I think this is an integral part of this, as this is really what everyone living in that area is concerned about and as you heard at the meeting the other night, there are, I believe 7000 people that live within that ½ km. danger zone and there are 4 schools within that danger zone. Your report states that it is one km.

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One Km.?

Potts: Yes. Isn't that correct?

Wilt: Yes. And 2509 school children are in that one area. We'd like to have you test them all. Not just our children.

Colony: I think that that is a valid point. I wonder if the WSSC could check the lead levels?

Stearns: I would question if the incinerators could have had any effect so far on the childrens' blood levels. I does make sense to check all the children....

Wilt: These particular tests cost $ 15,- each. The only thing that I would like to bring to your attention is that if they have not been incinerating very long, this lead is coming from somewhere, what happens when they start to burn?

Potts: That's some question....

Colony: I would like to go back to some of the points raised in response to the question, which you raised. One of my personal recommendations to the area administrator, whom I report directly to, following the hearing at the Oxon Hill High School, and not trying to make a good thing our of something bad, I was on the telephone with him from 12.30 a.m. till 1.30 a.m. filling him in on the results of the public hearing. And it was important enough to him that he actually had left a message to me when I got back for me to call him irregardless of what time it would be, when I talked to him. I made two basic recommendations: Number one, the EIS be reviewed with the utmost care and that the absolute maximum attention be given to all the written comments received. This would also take care of that letter from the Health Dept. Secondly I recommended to Mr. Snyder, that we initiate within EPA an attempt to undertake a study of every stack, whether it be a furnace, heating plant, power plant, refuse incinerator, sludge incinerator or whatever, every stack. I realise this was not something that could be accomplished in a short period of time, stacktesting is not a difficult study. It is expensive, it is time consuming, it takes preparation, you can't just climb up the stack and stick something into it and get a test, and get results. Sometime you have to modify the stack to knock a hole in it, to make a vent......

What do you want to test the stacks for?

Colony: I was interested in testing the major stacks for the very purpose of finding out where we have sources of lead, mercury, beryllium and other types of material. I would suggest to you, not with any factual data to back me up, that you are probably breathing right now here in this courthouse, air that carries particulate matter and other material from stacks all over this metropolitan area. This is an airshed, the high lead content, again without having any factual proof, the high lead content...... I would like to have mine tested, and I would assure you I would pay for it myself at the University of Virginia Hospital, where I can make arrangements

Colony: And I have a sneeking suspicion, that if there are high Blood levels in your area, there may also be in Fairfax Co., Arlington Co., Montgomery Co. and other places and I think, that here is something that maybe Dr. Sorensen investigate more than I investigate, because EPA is not a health agency. Maybe through the State Health Depts. and the local health depts. Some type of a survey should be granted. I have suggested to the EPA, that we try to arrange to have the radio stacks tested, to find out what is in this air from major stacks sources. We've got power plants heating plants and waste disposal incinerators and sludge incinerators as major stacks and I think............
But I don't see how you are going to conclude with any amount of assurance that the Piscataway Incinerators either should or should not be allowed to be operated just on the result of the sampling from that stack alone, and I mean that seriously...

Potts: Right...

Colony: Because this type of material I feel is part of the air from other sources as well, and if you get, as Mr. Gullett indicated, a very low lead emission fxx in the final result of the stacktesting from that incinerator, we will probably have people from EPA saying, that is fine, let 'em burn......

Wilt: I know, but, I agree, but if a month from now we go back to Childrens' and we get this test done again, and those levels are up in the 50's, whatever has come out of that stack in Piscataway is only adding to this, and far worse than death as far as I am concerned is for those children down there to have brain damage or something else. I can't see, how you can possibly put more lead into the air than what we already have?

Colony: Well, do you want to stop driving all the cars? You are putting lead into the air with every automobile exhause.

Wilt: I understand that, but why put it into the air by burning sludge? ??

Geller: Well, there is no way we can improve the quality of the air by burning anything, no way.

Wilt: Then why are you going to burn? ???

Well.......   Tape Out.

Wilt: And all these other people are getting sick too.

Well, is anybody sick?

Wilt: I have been sicker this year than ever in my life. And I know you could go back and say, it could be virus, it could be something else, which is true. But I have never been this sick, my children have been sick, everybody in that neighborhood has been sick. We are not saying, this is coming just from that plant, but if you add to it from the plant, I think ....

Colony: Well, we are going to, as I said, EPA is not a health agency, if we are advised by the officials in HEW and by the state and local health officials that our criteria in standard related areas is inadequate, if there is reason to stop the incineration of sludge across the country and they can back it up with factual evidence of a public health hazard, I can assure you EPA would take steps. But we don't have that data, we are not telling WSSC based on what we have now either to burn or not to burn at Piscataway.

Potts: But how can you set a limit and say that this is a safe emission of lead. And that would be on the assumption that a person had whatever they consider a normal level. But even one point might be too much if you were up in the levels. So it would depend on the lead level of the residents in the area, wouldn't it?

Colony: Mrs. Potts, again, I can only say this: In setting the emission levels for air and for water, you must recognize, that I happen to know that 98,6 is not nesecсarily the temperature of the human body. My temperature runs, and I have been under medical supervision constantly for the last two years, working around here does that (laughter), my normal temperature is 99,2. I am not well. And I would say this, the level that is set as criteria for emissions for waste water treatment plants for sonrces of air pollurion are in general just like 98,6 is. Sometime way back, if I can remember the whole story, I would tell it, there was a group of prisoners whose temperature was taken regularly and over a period of time, and it averaged out to be 98,6, and thats what you got. There is your average temperature. Now in the water field and in the air field, I think that a lot of our criteria is very similar to that. They are based on: 'It won't hurt fish', 'it won't destroy aqualic organisms'. In the air program, and I am not going to apologize for the air program, I've got the same gripes, that you have got about the air program. I am not sure of what is happening to me, when I am here or when I am in Richmond, or whereever I am, course I travel around, and down in our county I am sure it is all right, course there are no major emission stacks down there, but I donn't know that we have the evidence yet to say to this agency to stop using the incinerator.

Koontz: I think a a lot of the concerns of the people in the area is that why should people of P.G. County be used as guinea pigs to get the evidence, and that is essentially what we are talking about here.

Colony: I can only answer that by saying, YES, it is true, that EPA grants were available to support the construction of that waste water treatment plant of which the incinerator is an essential part. But we are not the ones, who are going to license or permit the effluent or emissions from that stack. The Maryland State Air Pollution Control Agency in coorporation with, I would hope, the Maryland State Health Dept. and local health officials, but not EPA. We are going to issue the permit for waste water discharge that will come out of the 90" or 108" pipeline or whatever it is. We are going to license that, but we don't issue permits for stack emissions

Koontz: Now, I recognize that, but that's the question I think we are faced with before this group.

Colony: Now I will let it all hang out. Now we are talking about things that haven't been done, and it is a real shame it hasn't been done. There are tens of thousands of incinerators in operation across the country. It hasn't been done. Why?

Stearns: There have been studies done on automobile emissions that showed the air and soil pollution to be rather high in the inner city, expressway, and there have been many studies done of poor children living downtown in concentrated areas, but there have been very few studies done on children living out in the country areas and especially from relatively well-to-do areas.......

Colony: Well, there just isn't any applicable data available...

ENVIRONMENTAL LEAD AS A DETERMINANT OF SUSCEPTIBILITY TO INFECTION

Abbreviated title: Lead and Infection

Lucile F Adamson, PhD
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The Environmental Defense Fund
1525 18th St., NW
Washington D.C., 20036

Dr. Green,

There is also ~~some~~ recent work by Gainer* (~~[illegible] Science journal; I don't have the reference with me~~) showing inhibition by ~~[illegible]~~ lead of interferon.

Although the devastating effects of acute lead poisoning are well-known to physicians and other public health workers, another health effect of lead which occurs at lower exposures has received little attention. Work with experimental animals indicates that low levels of lead, which may be comparable to those now found in urban residents, cause increased morbidity and mortality from bacterial infections. Whether or not lead has this same effect in humans is of more than academic interest, since much of the lead exposure of the human population could be prevented. However, the possibility of such an effect seems to have been generally overlooked.

Experimental Evidence

The animal experiments indicating enhancement by lead of susceptibility to infection are of three types: those which directly show increased morbidity and mortality from bacterial infections, after lead exposure; those which show increased sensitivity to directly administered bacterial endotoxins; and those which demonstrate impairment of specific immunological responses.

Experiments of the first type include those reported by Schroeder et al. (1, 2) and by Hemphill et al. (3). In Schroeder's experiments, groups of 50 or more animals of each sex were kept in an environment in which metallic contamination from air, water and food was minimized (2). Lead was supplied in the drinking water of some groups at a concentration of 5 ppm.

Some of the data from Schroeder's experiments are given in the following table:

Organ lead concentration at death (ppb)	Rats in a Low Lead Environment		Wild Rats	Human Adult**
	Control	Plus Lead		
	mean for adult males		mean	median
kidney	50	130	2040	100
liver	60	220	280	1700
heart	300	70	240	60
lung	110	110	910	500
spleen	90	240	800	400
Died of infection* (%)	49%	59%		
Median age at death (% control)	100	74		
Infant mortality (<3 mos.)	0	16%		

* There was an epidemic of pneumonia in the animal colony when the animals were just over 2 years old.

** Values from Tipton and Cook (4), cited by Schroeder.

As these data show, the group of rats in which lead had caused increased infant mortality and susceptibility to infection was characterized by organ lead concentrations at death which were in most cases lower than those of wild rats or adult humans.

Similar results were obtained with mice (1). In both species, males were more susceptible to this effect of lead than were females.

In the experiments of Hemphill *et al.*, mice were pre-exposed for 30 days to approximately 3 mg of lead/kg/day (injected intraperitoneally as lead acetate). No signs of lead toxicity were observed during this period. The lead-treated animals and the untreated controls were then exposed to a standard dose of *Salmonella typhimurium*. Within 7 days, 54% of the lead treated animals but only 13% of the controls had died of Salmonella infection. In terms of the LD_{50} of Salmonella, the control animals were 10 times as resistant to the bacterium as were the lead treated ones.

In a second type of experiment (5-11) lead treated animals have been shown to have increased sensitivity to purified bacterial endotoxins.

Selye *et al.* (5) showed in 1966 that a single dose of lead acetate increased the sensitivity of the rat to endotoxins of several types of gram negative bacteria by as much as 100,000 times. The highest dose of lead used (27 mg/kg body weight, as a single dose) was well-tolerated in the absence of endotoxin administration with no mortality being observed with lead alone or with purified endotoxin alone. If both lead and endotoxin were administered, however, 80-100% mortality was produced within 24 hours. If the dose of lead was lowered to as little as a single dose of 5.5 mg/kg, the effect was still significant (33% mortality).

These results were confirmed and extended by the other publications cited above (6-11). The dramatically increased sensitivity to endotoxin, after lead exposure, has been shown by Holper *et al*. to pertain to baboons (8) as well as to rats.

Experiments of a third type have demonstrated inhibition by lead exposure of specific defense mechanisms which protect against infectious agents. Fonzi *et al*. (12) reported that in contrast to control animals, lead-treated rabbits after vaccination with antityphoid vaccine showed no increase in antibody globulins, a decrease in the bactericidal power of the blood, a decrease in serum complement, and a deficiency of antityphoid antibodies. Trejo and DiLuzio (6) showed that lead acetate administered to normal rats decreased the ability of liver, spleen, and lung to inactivate endotoxin although this result was not confirmed by Filkins and Buchanan (9). These two latter investigations also reported contrasting effects of lead on reticuloendothelial phagocytosis with an increase being observed by Trejo and DiLuzio and a profound depression by Filkins and Buchanan. The mechanism of the increased susceptibility to endotoxin, observed by both groups, therefore, remains obscure.

Relevance to Humans of the Results with Animals

There is virtually no experimental evidence concerning the effect of low levels of lead on infective processes in humans. Rakhimova, however, did report that workers in a lead smelting plant demonstrated deranged phagocytic and bacteriocidal properties of the blood, disturbed antimicrobial function of the buccal mucosa, and adverse changes in the level of salivary lysozyme. All of these symptoms appeared prior to the emergence of cardinal signs of lead poisoning (13). They appear to be analogous to the effects reported in animals.

The question of whether current lead exposures of urban residents are detrimental to health is an important one. If the answer is affirmative, continued exposures should obviously be prevented insofar as possible. One such preventable exposure arises from the use of lead in gasoline. In 1968, approximately 181,000 tons of lead were released into the atmosphere of the United States as automotive emissions. The effects on human health of the resultant atmospheric lead and increased body lead levels are simply not known.

It is known that blood lead concentrations are higher in urban than in suburban areas (14-16), ranging in one study from an average of 12 µg/100 gm in rural residents to three times as much in urban parking lot attendants. It is also shown that mortality and morbidity for many diseases are correlated with air pollution levels (17). Nevertheless, because not all air pollution is from automobiles, and even that which is consists of a mixture of toxic compounds (including not only lead but also carbon monoxide, sulfur oxides, nitrogen oxides, and hydrocarbons), it has not been proven whether atmospheric lead *per se* is having adverse effects on human health. The experiments which would be required to prove or disprove this possibility have not been done.

In the absence of direct investigations of the effect of low lead exposures on humans, we should consider the data which are available from animal experiments. The problem of how to relate exposure levels in animals to those in humans then becomes crucial. In the data given above, lead exposures have been expressed as mg/kg body weight/day. These were much higher than the usual total daily intake of lead by humans but were comparable to the average body burden (mg/kg) of human adults.* In the absence of data on the proportion of the administered lead which was actually retained by the animals, comparisons with human exposures must be uncertain. A realistic estimate of human or animal exposures must take account of the fact that lead accumulates in the body and that the exposure

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* The average body burden of lead in adult humans has been variously estimated as being 1 to 11 mg/kg (see 18). Daily intake is estimated to be approximately 0.011 mg/kg/day by a WHO-FAO committee (19).

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on any day arises from both preaccumulated and newly absorbed lead. It must also be remembered that lead exposures in humans are experienced continually for decades rather than for the single day or month of an experiment.

Comparisons of human lead exposures with those effective in experimental animals can perhaps be demonstrated with most confidence with respect to the experiments of Schroeder et al. In these experiments, the actual tissue levels of lead were measured in animals in which the effect of lead had been observed. These effective tissue levels can be compared with typical tissue levels in adult humans. As shown in Table 1, lead caused increased susceptibility to infection and increased infant mortality in rats and mice at tissue concentrations comparable to or lower than current levels in tissues of human adults. This is perhaps the strongest indication that the human lead exposures which are now typical are within the range where adverse health effects can be expected.

The epidemiological evidence that is available is compatible with such a hypothesis (17). However, because most of the population has been exposed to increased air lead levels and because the groups which have been exposed to higher levels of lead have also been exposed to high levels of other pollutants, epidemiological observations cannot provide absolute proof of an effect or lack of effect of atmospheric lead on human health.

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Only a carefully designed experiment in which comparable groups of people were exposed for a long period of time to environmental conditions which were identical except for lead concentrations would be capable of proving that current typical environmental concentrations of lead do or do not have adverse effects on health.

Such an experiment would be difficult. However, the experience with rats and mice indicates that the dangerous expedient of increasing lead exposure may not be required for an experimental test of the effect of lead on health. In the animal experiments, animals whose tissue lead levels were lowered below the 'normal" level were shown to have greater susceptibility to infection than did those whose lead levels were lowered to an even greater extent. Therefore, a practicable human experiment can be envisaged in which, for example, infectious illnesses in infants experiencing "normal" lead exposures would be compared with those of infants given air, water, and food of lowered lead content.

Physicians and public health workers should be aware that current lead levels in both adults and children may be a factor in response to bacterial infections, and should be on the alert for opportunities to gather data to test this possibility. As illustrated by two recent reviews (20, 21) concerned with the question of possible health effects in humans of current levels of environmental lead pollution, there appears to have been a general failure on the part of people interested in this question to consider the implications of the animal work reviewed above.

Summary

Several published studies have indicated that a single dose of lead causes a dramatic increase in the susceptibility of experimental animals to bacterial endotoxins. Other workers have shown that animals treated with low levels of lead exhibit increased mortality from bacterial infections and impaired immunological responses to active immunization. One or more of these effects have been shown in rats, mice, rabbits, and baboons.

On a body weight basis, the lead concentrations associated with increased susceptibility of infection in animals are no greater than those to which urban residents are commonly subjected. Although there are some direct indications that lead exposure in humans also causes adverse immunological effects, there has apparently been little consideration of the possibility that the present level of exposure of humans to environmental lead is having effects comparable to those which it has in other animals.

[illegible] and Infection: [illegible]

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Response: Air Pollution Committee, Prince George's Environment Coalition (The Physiological Hazard from Lead Pollution, dated April 7, 1974)

These comments respond to several of the meteorological and toxocological aspects of Mr. Repace's analysis:

1. Lead emissions from the Piscataway Incinerator are certainly not well defined at this time. Since the latest test, it would seem to be some place between 9 pounds/day (theoretical) and .0088 pounds/day (measured). This is a huge area difference. The final number will probably be somewhere closer to the lower value than the upper.

2. See comment #14, "25 Questions".

3. This is an incorrect interpretation of a stability wind rose. According to the annual average stability wind rose for National Airport, (which is not too different from the Piscataway area meteorologically) stability E with winds from the south southwest at all speeds occur 3.24% of the time. Of this percentage, winds between 4 and 6 knots (approximately 2 meters per second) occur 0.43% of the total time or 38 hours per year. Most of these hours will not be concurrent.

4. The correct equation was used. However, the calculation of "Q" is wrong. Even assuming 26 lbs/day the correct calculation is: 26 lbs/day x 1/24 x 1/60 x 1/60 x 453.6 x 10^6 = 1/3 x 10^5 ug/sec. And again, this is assuming that 26 pounds per day is correct. Therefore, using the corrected emissions factors, but realizing the possible emissions are some place between 9 pounds and .0088 pounds, the short-term concentration is some place between 11.1 ug per cubic meter and .011 ug per cubic meter for a 1 hour concentration, but this concentration is only for short-term; one or two hours at the most. Long-term average concentrations will be considerably less with the approximate concentrations as given in the draft Environmental Impact Statements because of the decreased emission factor. It is the long-term concentrations that are important in determining whether or not there will be a health effect from lead.

5. Pressure drop in the Piscataway scrubbers is rated at 50 to 60 inches, and was measured at 57 inches during recent testing.

12. The uptake figure as given is wrong, in part because the frequency of meteorological conditions is not as indicated here. See statements on #3.

14. Again the assumptions on meteorological conditions are incorrect.

See the note on toxicology of lead in Appendix C.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SUBJECT: Details of a Meeting held to discuss the Piscataway Draft EIS **DATE:** APR 2 - 1974

FROM: AH

TO: Daniel Snyder, Regional Administrator
Region III

On Friday, April 12th, I met with Ms. Marian Agnew, a representative from the Northern Virginia Conservation Council, and Ms. Ulla Rudd, a resident of the area near the Piscataway, Maryland wastewater treatment plant, et al. They expressed two major concerns and presented supporting documentation that they wish to see discussed by Region III in the final environmental impact statement on the Piscataway treatment system. These concerns are;

a) Topography-The final EIS should discuss the topography of the area and how the incinerators will impact on the environment of that area. They have alleged that since the location of the incinerator stacks will be in a basin, homes on the rim of the basin will have smoke emissions blowing into the windows.

b) Incinerators - Ms. Agnew wanted to receive assurance from EPA that the incinerators not resume operation until 30 days after publication of the final EIS.

We are enclosing the materials they presented to me in the meeting and hope that they are relevant to the preparation of the final EIS on the Piscataway plant expansion.

Sheldon Meyers
Sheldon Meyers
Director
Office of Federal Activities

Enclosures

EPA Form 1320-6 (Rev. 6-72)

April 18, 1974
13801 Piscataway Dr.
Oxon Hill, Md. 20022

OFA-155
PS
Due: 5-15

Mr. Sheldon Meyers
Director, Office of Federal Activities
EPA
Mail Code A 104
401 M. St., SW
Washington, D.C. 20460

Dear Mr. Meyers,

I would like to request that the reports turned over to you during our meeting on April 11, 1974 at your office be forwarded to Mr. Snyder to be included in the final impact statement on the incinerators at Piscataway.

The reports were: The Physiological Hazard from Lead Pollution from the WSSC Piscataway Sewage Sludge Incinerator, by Dr. James L. Repace, 101 Felicia Lane, Bowie, Md.

Transcript of taped meeting on March 21st 1974 at the P.G. Courthouse. Representing EPA: Dan Geller and Bill Colony.

Preliminary Values for Atmospheric Lead Concentrations at Accokeek, Maryland. (Showing 6 months of tests missing, including the entire time the incinerator was in operation).

You said at the meeting, that you would inform Mr. Russell Train about above. I would like to know what Mr. Train is going to do? Again at this point the only thing we are actually asking is for EPA to follow the NEPA act. Although you constructed the facility without first preparing an impact statement, all we are asking at this point is that you after a minimum of 90 days after the public hearing on the Draft impact statement, prepare the final impact statement answering all questions raised, and that no incineration can take place until 30 days after the final EIS has been approved by the Council of Environmental Quality. We want EPA to take special care to determine the impact on the health of the residents in the box canyon facing the plant. After all, what is the environment if it is unfit for human habitation.

Again, thank you very much for meeting with us. We hope Mr. Train and you will soon come down and see the area for yourselves.

Sincerely

April 18, 1974
13801 Piscataway Dr.
Oxon Hill, Md. 20022

Mr. Sheldon Meyers
Dir., Office of Federal Activities,
EPA
Mail Code A 104
401 M. St., SW
Washington, D.C. 20460

Dear Mr. Meyers,

The P.G. Health Dept., HEW and yourself have been quoting results from an EPA stacktest done on the Piscataway Incinerator. However, we are told that the report is not yet public???

I would like to request an immediate copy of above stacktesting results.

I would also like to ask you to supply me with the following information: The name of the person, who performed the stacktest.
The date or dates of the stacktest.
The time involved.
The method involved.
The volume of sludge burned.

Thanking you again for your kind cooperation,

Sincerely

Ulla Riedel

2 JUL [illegible]

[illegible]
13[illegible] [illegible] Drive
Oxon Hill, Maryland 20022

Dear Ms. [illegible]:

I received your correspondence of April 18th relating to our discussions of the previous week and have [illegible] both Mr. Irvin and Mr. Snyder, EPA's Regional Administrator in Philadelphia, about them. I have asked Mr. Snyder's staff to send you the preliminary results of the [illegible] done on the Piscataway incinerator. Mr. Gary [illegible] of the Public Affairs Office in Philadelphia is sending you a copy of these preliminary results. I also [illegible] your materials to the Regional Administrator and they will be incorporated in the final EIS on the Piscataway facility.

I would like to bring you up to date on the Agency's activities with regard to the Piscataway facility [illegible] spoke. The scope of the Piscataway draft EIS was limited to the upgrading and expansion of the Piscataway facility to 30 MGD advanced wastewater treatment including the construction of a 10[illegible] effluent discharge line to the Potomac River. The assumption was made in the draft EIS that incineration would be the primary method of sludge disposal since incineration facilities were already present and any other sludge treatment and disposal methods not utilizing the existing facilities would not be cost effective. These assumptions and conclusions are being re-evaluated in the preparation of the final EIS.

The Piscataway incinerators were operated for testing purposes on a limited basis from January to March 1974, for a total of approximately 72 hours. [illegible] citizen complaints about a possible health hazard from incinerator lead emissions, EPA Region III on March 2[illegible], [illegible] Piscataway until results of the stack tests, which were being performed by the EPA National Environmental Research

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Center at Research Triangle Park, North Carolina, had been received. On April 12th, the preliminary results from these tests were received and indicated that lead emissions were very low and did not constitute a public health hazard. (The results of these tests and subsequent diffusion analysis will be presented in the final EIS). Consequently, EPA Region III notified WSSC on April 30th that the operation of the incinerators could be resumed for testing purposes.

The final EIS on Piscataway will contain a plan being developed by WSSC, which was requested by EPA, for an alternative method of sludge treatment and disposal, which would be implemented if the ongoing analysis shows the incinerators will be a probable health hazard. Finally, two independent consultants are conducting studies on the facility's emissions as well as on ambient air quality in the Piscataway area. When these are completed, the results will be presented in a supplement to the final EIS. However, EPA will not allow the incinerators to be routinely operated until we are convinced that they do not represent a hazard to the public health and welfare.

I believe that the actions of Region III these past several months indicate that the Regional Administrator has not made a definite commitment to a method of sludge disposal at the Piscataway facility. I have informed both the Administrator and the Regional Administrator in Philadelphia about your concerns and provided them with the materials expressing your concerns which will be incorporated into the Piscataway final EIS. I apologize for the delay in my response, but I did want to assure you that the issues you raised in our discussion are being acted upon by the Agency.

Sincerely yours,

Sgd. Sheldon Meyers

Sheldon Meyers
Director
Office of Federal Activities

cc: Regional Administrator, Region III
Bob Blanco, Region III
OFA Official file
OFA Reading file
ALP Reading file

NCronin:hl 7/1/74:ALP:A-104

718 Gleneagles Drive
Tantallon, Md. 20022
May 28, 1974

Mr. Robert J. Blanco, P.E.
Chief, Environmental Impact Branch
U.S. Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pa. 19106

Dear Mr. Blanco:

Enclosed are my comments following a review of your agency's "Draft Environmental Impact Statement-Upgrading and Expansion of the USSC Piscataway Wastewater Treatment Facility to 30 MGD AWT". For the sake of brevity, I attempted to eliminate those comments which had already been elaborated upon by a number of other speakers in my verbal statement at the Public Hearing in Oxon Hill, Md. on March 7, 1974.

I, also, wish to apologize for the delay in submitting a more complete written version of my comments and realize that it may be too late for your consideration. However, there is little I have to offer here that was not repeated over and over by my fellow citizens and neighbors and my comments will hopefully reinforce those which you have already received. In fact, I cannot recollect from my attendance at other Public Hearings such unanimity among so many people as I heard that night - with the exception of some public officials, their representatives and developers who have a vested interest in the speedy completion of Piscataway expansion. The citizens who commented included engineers and scientists and those who had educated themselves regarding the issues. As an engineer with experience in public safety and environmental matters, I considered most of their comments well founded.

Our comments were not intended to seek relocation of the expanded treatment capacity somewhere else far away from our communities but rather that any decisions will be based upon thorough analyses and disclosure of all reasonable alternatives and possible environmental impacts - as required by NEPA. If conclusions based upon such analyses can prove that Piscataway is an appropriate site for expanded AWT capacity and that the best alternative for sludge disposal in view of public health and resource utilization is incineration, then we can have no valid objections. However, the DRAFT EIS did not substantiate its claims by sufficient analyses and, at times, appeared to have drawn conclusions contrary to the supporting analyses and data.

Would you please include me on your mailing list for the revised EIS. Also, I wish to acknowledge receipt of the Draft EIS from the Office of your Director of Public Affairs.

Sincerely yours,

Benjamin R. Swann

Enc.

STATEMENT AT PUBLIC HEARING REGARDING DRAFT EIS FOR PROPOSED UPGRADING AND EXPANSION OF PISCATAWAY WASTETREATMENT FACILITY (PWTF)

7 March 1974
by
Benjamin R. Swann

I am presenting my comments as a resident of Tantallon, Md. a community near the PWTF.

I have reviewed this EIS and found that it does not satisfactorily assess the environmental effects of the proposed plant nor does it provide a thorough assessment of alternatives. It is not my intention to discuss all the faults which I found in this EIS but rather to provide my own point of view on a few select issues.

In general the underlying causes of my criticism rest with the lack of adequate criteria for the selection and assessment of alternatives which must be evaluated in the EIS. There appear to be no guidelines for site selection, alternate waste treatment schemes, consideration of waste treatment facilities of neighboring jurisdictions, or identification of those factors which should be analyzed. The existing PWTF exemplifies what will happen when there are pressures to increase waste treatment capacities without such guidelines. The plant is simply located in the area of least political resistence and an EIS is, then, prepared to show that the selection was the best choice after all. This particular EIS does, in fact, use the existence of newly constructed facilities to justify their complete utilization. ①

The site for this plant was not originally selected based upon its merits for waste treatment. Rather it was selected many years ago by one of the early developers of the Tantallon area who needed waste treatment capacity in order to obtain local government approval for their residential developments. It was necessary for them to construct a WTF on their own land and the Piscataway site was the most economical choice for them at that time. This point should be remembered when considering expansion since it is doubtful that Piscataway would have been selected for a regional treatment facility today if the local treatment facility were not already there.

The EIS presents a considerable amount of valid data which has not been properly assessed in my opinion and it neglects to consider other important factors. Specifically, the future availability of resources upon which effective treatment must depend were not considered. There are indications that some of the chemicals used in treatment and the fuel necessary for incineration may become more difficult to obtain in future years (Excuse me for the understatement). The PWTF will be competing with other users throughout the world for the necessary ingredients in its proposed ② waste treatment process. The possible outcomes would be increased costs, depletion of these resources or their diversion to more critical uses. Any of these would invalidate the evaluations made by this EIS.

③ The EIS has failed to identify a definite alternative to incineration in the event of future energy crises. The extent of any contingency planning deals with the current fuel shortage. In this regard, letters have been sent to the County Health Officer and the Maryland Environmental Service requesting "immediate acceptance of undigested sludge from the commission plants for composting at the Beltsville Agricultural Research Center or any other appropriate site". The panic decisions associated with the search for solutions to crises cannot be accepted. Yet, with our increasing dependence on Arab and foreign sources for oil, it is quite conceivable that future disagreements between governments can lead us back to a situation similar to the one which we are experiencing today. - When our nation does become self-sufficient in energy, many years into the future, it is doubtful that oil burning incinerators will be the way to go. Therefore, you may have preplanned obsolence into the PWTF.

④ The EIS claims that it was not able to forecast the shortage of fuel. We assume a similar position has been taken in disregarding the future availability of other resources necessary to plant operation. Yet such data has been available. Numerous studies on the supplies and demands for the resources have reasonably well predicted our national trends (including the current energy dilemma) and many of these study reports have been available for several years. One such report entitled "Resources for Freedom" was published in June 1952 by the President's Material Policy Commission.

⑤ The EIS has described complete land treatment of waste water as one of the most efficient means of water reclamation. Even though the EIS has disregarded coincident benefits from land treatment, the detrimental effects of the proposed facility, and the likely escalation of costs for the chemicals and fuel needed in the proposed facility, I estimated using data provided in the EIS that the cost for water and sewer service would be increased by about 20% if land treatment were used instead of the proposed treatment. Most likely if all pertinent factors had been considered, the costs might even be lower. I would not object to these small increased costs when I consider the benefits. However, ~~this~~ land treatment was rejected from further consideration due to the initial high cost of land acquisition even though operating costs would be less and the report acknowledges that land treatment has been employed in other parts of this country and the world with success.

⑥ In regards to making minimal changes to the proposed facility, the manner of sludge disposal should be reconsidered in view of the difficulty of acquiring fuel for the incinerators. The plant process should be modified to allow the disposal of digested sludge in a planned land fill program or, even better, using it for agricultural enhancement or composting and fertilizer production.

The necessary trucking of sludge between any two places in the county would require only 2 to 3 percent of the fuel used for incineration. Further, it is interesting to note that after incineration, we still must dispose of a quantity of ash equivalent in weight to 30 percent of the dry sludge.

I am also concerned that the incinerator will emit heavy metal ⑦ products which are still under evaluation by EPA. In essence, you are using those living close to the plant as guinea pigs by exposing them to toxic materials which are known to possess long term, cumulative and irrecoverable effects. It is a scientific fact that you cannot destroy matter by ~~simply~~ burning. You simply alter the chemistry of the incoming elements and distribute them on the surrounding communities as the incinerator stack gas disperses. The remaining ash must still be disposed of. In fact you have added a quantity of fuel to the process whose combustion products will also be spewed upon nearby communities (25% increase by weight).

Finally, we wish to point out that you are influencing the ⑧ growth trends in Prince Georges County by expanding this plant. Plant expansion has been demonstrated to proceed growth rather than respond to growth as the EIS seems to imply. However, the EIS did not evaluate the ability of other county resources to accomodate this growth and maybe this should be part of a complete Environmental Impact Study.

In closing, I hope you realize that my neighbors and I are not opposed to expansion of the PWTP simply because it is in our neighborhood, although its presence sharpens our interest. But we do expect an EIS which realistically evaluates all factors relative to the benefits and detrimental effects of all reasonable alternates. Further, we recognize that waste treatment is a complex and difficult problem which demands considerable innovation as our various environmental cycles begin to close. The current EIS fails in these respects and, therefore, cannot be taken as a credible dissertation that the proposed expansion of the PWTP is the best alternative available.

Thank you for this opportunity to express my views.

Response: Benjamin R. Swann

①

The alternatives section of the EIS has been revised to include a more detailed evaluation of some alternatives. The proposed project does not include expansion of the Piscataway facility beyond the already existing 30 mgd capacity. It does, however, allow this existing capacity to be utilized. The expansion only refers to the allowable discharge. Feasible alternatives were addressed based on these considerations.

②

These concerns have been addressed in the Final EIS.

③

Section IV of the Final EIS has been revised to include a definite plan for an alternative to incineration.

④

Possible shortages of materials and resources have been addressed to the extent possible. Various reports as to the speculation on the availability of materials are many times out-of-date by the time they are printed.

⑤

This section of the EIS has been updated and revised. The primary disadvantages of land treatment at Piscataway is the non-suitability of the soils and groundwater table.

⑥

Alternatives to incineration are being considered and planned for. EPA will not decide finally about means of sludge disposal until after release of the Supplement to this EIS.

⑦

EPA is convinced that testing of the Piscataway incinerators will not present a hazard to public health. The extensive testing program will determine the extent and effect of the emission of heavy metals into the atmosphere.

⑧

As stated in Section IV.B.3., upgrading at Piscataway and construction of the outfall line will allow the facility to be used at its existing capacity (30 mgd) and eventually, should further treatment capacity be added in the future, to treat wastewater in an expanded service area. There is relatively little growth associated with this project (25 percent in the next 33 years).

TO: MR Robert BLANCO,
Environmental Protection Agency (6th & Walnut) 30 MAY 1974
Philadelphia, Pa.

TWENTY-FIVE QUESTIONS REGARDING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE PISCATAWAY AWT PLANT.

J.L. REPACE, Chairman, Air Pollution Committee
P.G. Enviroment Coalition
101 Felicia Lane, Bowie, MD 20715

1. Asbestos, a carcinogen, has been observed in Piscataway sludge by a local chemist. Why was the sludge not examined for asbestos by EPA using the techniques of optical and electron microscopy? What are the expected asbestos em~~m~~issions?

2. Since it is planned to divert effluent from the Blue Plains STP to Piscataway, or from the area now served by the Blue Plains plant, what is the justification for assuming 1.54ppm mercury in Piscataway sludge will be valid when the mercury concentration in Blue Plains sludge has been found by EPA to average 6.1ppm?

3. How can the populace downwind of the incinerator be protected from accidental or intentional contamination of sludge with large amounts of toxic, carcinogenic, or radioactive wastes?

4. What is the air pollution hazard from the "thermal regeneration" of lime and other chemicals?

5. What amounts of acid chlorides will be emitted from the stacks; what effect will the presence of acid chlorides from $FeCl_3$ combustion have on the scrubber?

Page two (2)

6. How can the scrubber efficiency be quoted in the EIS as 99.9% removal by weight when the particle size distribution emitted from the furnace is unknown? What is the actual particle size distribution? BEFORE AND AFTER THE SCRUBBER?

7. What is the average long-term operational efficiency of a 40" W.G. Venturi Scrubber, and how was this determined?

8. How could EPA estimate em~~m~~issions of 26 lbs. of lead/day and say that this does not present a hazard is view of the topography?

9. Can EPA show that the incineration of sewage sludge does not violate the Van der Jagt Amendment to the Water Pollution Control Act?

10. Why was the sludge not analyzed for (at least) all the toxic materials referred to by Dr. Shy in his letter "Hazards of Emmissions from Sewage Sludge Emissions"?

11. Why was a comprehensive chemical analysis of particulates not done for all toxic elements found in sewage sludge, and emission factors computed for each, plus maximum downwind concentrations under the worst atmospheric conditions?

12. Why was the incinerator not operated at maximum rates in emission calculations in view of the anticipated increases in wastewater flows projected by the EIS?

13. Why is no provision made for routine daily monitoring of trace metal and pesticide levels to prevent contaminated sludge from being burned? Including radioactivity?

14. Why were the stack heights not designed according to sound engineering practice of >2.5 times the building height to prevent aerodynamic downwash?

15. What will the total maximum emissions of all pollutants be on a daily and yearly basis? Including sulfates.

16. What will the maximum concentrations of each of these pollutants be at 500 meters, 1000 meters, 1500 meters, 2000 meters, under worst possible atmospheric conditions, taking into account topography and maximum sludge incineration rates, if the concentrations are averaged over time intervals of 5 minutes, 1 hour, 24 hours, 1 week, 1 month, 1 year, for each of the 22-1/2° sectors of the Piscataway windrose?

17. How much fuel will the incinerator consume per year, and what will it cost; if #2 oil is not available, what alternative fuels will be used, and what will their average sulfur content be? How much SO_2, SO_3, and H_2SO_4 will be emitted from the incinerator stacks under each option?

18. Why was topography not taken into account in determining ground level concentrations? Why were daily and hourly maximum averages not computed for all pollutants, since local air quality regulations specify excessive levels?

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19. Is it not true that the chemical elements found in Piscataway sludge, which if emitted from the plant in sufficient quantity are capable of causing or exacerbating cancer, birth defects, chronic bronchitis, asthma, emphysema, corpulmonale, heart disease, and mental retardation? What provisions are made to see that these pollutants, taken separately and synergistically are emitted in quantities less than that which would cause morbidity and mortality thresholds to be exceeded?

20. Is it not true that there are approximately 2300 abandoned strip mines in the state of MD; and that from one to two empty coal hopper cars could transport Piscataway sludge from a suitably built rail siding to some of these mines for disposal at a cost of approximately $25/carload?

21. Why does the EIS make no attempt to calculate the increased risk of morbidity and mortality from air pollutants from the incinerator?

22. Why were the daily, monthly, and annual averages for suspended particulates not calculated in the EIS?

23. Why is a pipeline capable of carring 457 MGD being installed on a 30 MGD plant? Is it not true that another plant the size of Blue Plains is envisaged? Why were emissions of pollutants not scaled up to rates emitted by a 457 MGD plant?

24. Since the Enviromental Defense Fund has caused EPA to consider standards for hazardous pollutant [illegible] emissions from sewage sludge incinerators, will Piscataway be able to satisfy these standards, present and future, and at what levels of sludge incineration [illegible]

will those emission limits be exceeded?

25.

What is the distribution of population by number and age as a function of distance from the incinerator inside concentric rings of radius .5, 1, 1.5, 2, 2.5, 3,4,5, 10 kilometers? What is the background level of exposure to all pollutants that the incinerator will emit, and what is the expected % increase in exposure due to the incinerator?

26. Is it not true that disposal costs per ton of sludge are between $10 - $20 for land methods, whereas incineration costs (prior to the fuel crisis) exceed $55?

Question: Shall we permit fuel allocation to sewage treatment plants to turn sludge ~~when~~ where alternative treatments exist?

Answer: No. According to a press release from USDA, dated 18 Sept. 1973, Secretary of Agriculture Earl L. Butz has stated "It now looks as if composting comes closer to being technically efficient, economically sound, environmentally safe, agriculturally beneficial, and potentially feasible than any of the alternative methods for disposing of sewage sludge."

The Federal Water Pollution Control Act, The USDA, The Corps of Engineers, and sanitary districts in Chicago, Ill., and Muskegon, Mich. are actively promoting landspreading as an alternative to incineration. Since the sewage treatment plant in Washington, D.C. alone will use more than 20 million gallons of #2 oil per year, denial of allocation to sewage treatment plant incinerators would save several hundred million gallons per annum.

Supporting Evidence

There are 2300 Abandoned stripmines in the State of Maryland. (Md. Env. Health Admin.) From 10-15 empty coal cars could be utilized on a daily basis to haul the entire output of the Blue Plains plant at an approximate cost of $250/day. J.L. Repace, Naval Res. Lab.

"Landspreading ~~af~~ (of sewage sludge) is the only method of disposal which does not waste a potential soil-building material. It is capable of disposing of the 550 tons of sludge generated daily at the Blue Plains Wastewater treatment plant, Washington, D.C. ... The demonstration project also shows that costs for composting ... will be less than for incineration."

Dr. J.M. Walker, USDA, Beltsville, Md.

Fulton county, Ill. has utilized sewage sludge from Chicago to reclaim strip-mined land. High yields of corn were grown on the reclaimed acreage. No water or air pollution attends the process, and disposal costs were about ½ that of incineration.

TIME magazine, Sept. 27, 1971, p 93

The Vander Jagt amendment to the Federal Water Pollution Control Act (HR 11896) states that it shall be national policy for the administrator to provide for the "recycling of potential sewage pollutants through the production of agriculture, silviculture, or aquaculture products", and to "provide for the ultimate disposal of sludge in a manner that will not result in environmental hazards."

A publication by the Scientific Consultant to the The U.S. Army Corps of Engineers has stated that concentrations of sulphur dioxide and mercury in the vicinity of sludge incinerators were comparable to that found near coal-burning power plants and mercury plants, thus converting a water pollution program into an air pollution problem. It has also praised the Muskegon county Mich. spray-irrigation wastewater management system of landspreading of sewage.

"Pollution Control: Wastewater Irrigation"
J.H. Sheaffer, DePaul Law Review XXI:937, 197

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Response: Air Pollution Committee, Prince George's Environmental Coalition (25 Questions, dated May 30, 1974)

1.

Traces of almost every environmental element and compound can be detected in samples of sludge when using analytical equipment of very high resolution. The high energy scrubber used at Piscataway will remove most of the particulate emissions (greater than 99.9 percent). EPA has not yet established sludge incineration standards in the National Emission Standards for Hazardous Air Pollutants (Asbestos, Beryllium, Mercury), promulgated on April 6, 1973.

2.

Since effluent from Blue Plains' current service area, as well as diversions from other plants are not well defined at present, it is impossible to estimate what the future mercury content of Piscataway sludge will be.

3.

This question is too hypothetical for a specific response. However, monitoring of sewage contents is the only sure means of detecting such contamination. The highly residential source of Piscataway sludge makes this possibility of hazard remote. See #13 below.

4.

The present 5 mgd pilot lime regeneration plant will not be expanded, so its (low) emissions are not discussed in this EIS.

5.

No $FeCl_3$ is to be used in the plant; thus none will be present in the sludge.

6.
Because the particle size distribution for sludge incinerators is not well known, a very conservative average particle size (1 u) was selected in estimating scrubber efficiency.

7.
See #6 above.

8.
EPA estimated that if the control system operates at 10 percent efficiency, there would be 26 pounds per day of lead emissions. Preliminary testing, discussed in Appendix A, show that at least 18 pounds are captured, and 4 grams per day are emitted to the atmosphere. Literature indicates that the efficiency of the test train in capturing lead emissions is high. There are several explanations on the remainder of the (calculated) lead entering the incinerator.

9.
The Vander Jagt Amendment to the FWPCA Amendments of 1972 (Subsections 201(d), (e), and (f)) encourages the recycling of sewage effluents and sludges. The Piscataway incinerator has already been constructed and must be considered as a primary alternative means of sludge disposal because of the Act's requirement to achieve cost-effectiveness. In light of Subsection 201(d)(4), which requires that "the ultimate disposal of sludge (be) in a manner that will not result in environmental hazards", EPA has performed preliminary stack tests and is requiring a definitive testing program of the Piscataway incinerator before permitting its routine use. If the tests eventually show that there is any environmental hazard

associated with the operation of the Piscataway incinerator, WSSC's contingency plan for sludge disposal will be used immediately. In general, EPA encourages recycling of wastes where appropriate conditions exist.

10.

From available data, it was determined that only mercury and lead would be emitted without the high degree of control efficiency estimated for particulates. Other particulates would be well-controlled, and much below a potentially hazardous amount. The testing which will be done by Battelle Laboratories will include analysis for the complete range of hazardous materials.

11.

See #10 above.

12.

Maximum emissions are presented for the incinerator, at present capacity of the system (see Appendix A).

13.

Routine testing and analysis of sludges for exotic elements and compounds is expensive, time consuming, and more importantly, does not give real-time results. Furthermore, the chances of any hazardous contamination from predominantly residential sources, as in the Piscataway service area, is almost null. Industrial sources are required to pretreat wastewater when appropriate.

14.

Downwash is misunderstood in this question. Downwash occurs when the plume is trapped in the wake of the building and is brought to the ground very close to the building. This is not the same process as fumigation, which occurs when a plume trapped in a stable layer is suddenly dispersed by unstable air rising into the stable air due to surface heating. No fumigation could occur at wind speeds greater than 2m/sec. Because of the facility's location, aesthetics played a role in determining stack height.

15.
Emissions of the major pollutants are presented for the appropriate time frames in this EIS.

16.
These concentrations are presented in Appendix B. Revised figures are significantly lower than those indicated in the draft EIS.

17.
Each operating incinerator will consume 60 gallons/hour of fuel oil. It is impossible to predict conditions of the fuel oil market. Emissions of SO_x vary almost directly with fuel sulfur content.

18.
Topography was considered in determining ground level concentrations. Daily and hourly pollution levels were computed only for those pollutants for which daily and hourly levels are related to public health and welfare.

19.
The use of a 50" W. G. scrubber represents a high degree of control and assures that particulate emissions will be very low. During EPA testing, pressure drop in the Piscataway scrubbers was measured at 57 inches.

20.
Not all strip mines are suitable for depositing sludge. Political difficulties, however, are the biggest obstacle to transporting Prince George's sludge to the western Maryland counties.

21.
Such a task is almost impossible to perform with any degree of confidence. See Appendix C.

22.
It is the long-term concentrations that are important in determining whether or not there will be a health effect from lead emissions. Because emissions from the incinerators represent only a small proportion of lead in the Piscataway area, more precise calculations would not be very useful.

23.
The proposed 108" outfall line was designed to be able to handle peak flows from the Piscataway facility at the maximum size presently contemplated. As stated many times in the EIS, expansion beyond 30 mgd will require an additional environmental review.

24.
No additional standards for sludge incinerators have yet been promulgated. At present, only a mercury emissions standard is under review; Piscataway mercury emissions are low and will readily meet any standard that may be promulgated.

25.
An age distribution of population, by location, has not been determined. The potential health effects of the Piscataway incinerators are discussed in this EIS, and will be addressed further in a Supplement after completion of the testing program.

26.
Costs vary for individual treatment facilities; operating costs for land disposal is, in general, less expensive than incineration.

Guarding America's Heritage

National Trust for Historic Preservation

740-748 JACKSON PLACE, N.W. WASHINGTON, D.C. 20006 (202) 382-3304

August 28, 1974

Mr. Daniel J. Snyder, III
Regional Administrator
Region III
Environmental Protection Agency
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

The National Trust for Historic Preservation is a private non-profit educational organization concerned with the protection of our nation's historic and cultural resources. We are herewith submitting our comments on the draft enviornmental impact statement pertaining to the project proposed by the Washington Suburban Sanitary Commission for the upgrading and expansion of the Piscataway wastewater treatment facility. Although the formal date for submitting a formal statement has expired, it is hoped that our comments may be given consideration for inclusion in the final version.

The site of the proposed project is in close proximity to historic landmarks and recreation areas of national significance, such as Mount Vernon (a National Historic Landmark), Fort Washington and Fort Hunt National Parks. The site of the project itself, Piscataway Park, is a historic area created expressly for the purpose of preserving the view from Mount Vernon of the Maryland Potomac River shore. We feel that the draft statement does not adequately discuss what the aesthetic and visual impact of the completed project will be on these nationally significant sites. It is not clear from reading the draft whether the outlet of the outfall pipeline or additional construction of treatment facilities will be visible from Mount Vernon, Fort Washington and other historic sites in the vicinity. We would like to see the final impact statement treat fully the visual and aesthetic impact of the completed project on the historic and other nationally significant sites. Perspective drawings showing site lines should be included. We urge that every effort be made to mitigate the visual impact of this project on our nation's valued historic and cultural resources.

Sincerely,

Russell V. Keune
Director
Field Services

cc: Mr. Steven Torok

Preservation is Progress 25th Anniversary Year 1949-1974

Response: National Trust for Historic Preservation

The EIS has been revised to reflect these concerns.

Mr. J. H. Rhodes

Mr. Harold A. Williams, President,Warburton Manor
Citizens Association

Mr. and Mrs. Robert Nordstrom

Ms. Edna Henderson

Mr. and Mrs. Ronald E. Kngarise

Mrs. Gerald Fratantuono

Mrs. Sharon Wright

Ms. Erica G. Kenney, President PTSA Eugene Burroughs
Junior High School

Mr. Joseph J. Meder, President, Harmony Hall PTA

Mr. and Mrs. W. R. Buterbaugh

The EIS has been revised to address the concerns raised by the citizens above. In addition, these concerns have been discussed in detail, in responses to other more detailed comments. As is discussed in the Final EIS, subsequent to the completion of the testing of the Piscataway incinerators, EPA will issue a Supplement to the Final EIS presenting the results of the testing program and EPA's conclusions as to the impacts on air quality and the public health.

The comments received from the National Association of Realtors, Charles G. Dalrymple (Linowes and Blocher), Jim B. Bock, and Charles E. Campbell indicated support of the proposed project and need no response. However, Charles G. Dalrymple and Jim B. Bock recommended an alternative to incineration if possible. The EIS has been revised to include discussions on alternatives to incineration, and it has been determined that the mode of sludge treatment and disposal will be finally determined after the Piscataway incinerator testing program has been completed. These results will be published in a Supplement to this Final EIS, thereby not delaying the AWT additions and installation of the 108" effluent pipe.

Director of Public Affairs
EPA, Region III
6th and Walnut St.
Philadelphia, Pa. 19106

Dear Sir:

Please accept this letter in lieu of a personal appearance at the hearings concerning the sludge incinerators at the Piscataway Sewage Treatment Plant in Prince George's County, Maryland.

I am torn between believing what the newspapers and responsible citizens say concerning the effects of toxic fallout from sludge incinerators and believing that the EPA would actually condone such a horror. I am persuaded, however, that there is much evidence to indicate the EPA has made an untypical but very serious mistake. Surely, there is a better alternative such as making fertilizer out of the sludge!

Please don't allow the sludge incinerators to operate!

Sincerely,

H J Rhodes

H. J. Rhodes
13103 Venango Road
Oxon Hill, Md. 20022

3/9/74

708 Buckmaster Lane
Oxon Hill, Maryland 20022

March 12, 1973

Daniel J. Snyder III, Regional Administrator
c/o Director of Public Affairs
Environmental Protection Agency, Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

Subject: Impact Statement on Expansion of Piscataway
Waste Treatment Plant

I recently had the privilege of attending a hearing conducted by representatives of the EPA concerning the above subject. I was most impressed by the quality of the arguments which were set forth by the citizenry in objection to the draft impact statement. It was obvious to me, from the logic of the argument alone, that the impact statement was hastily conceived and failed in its stated purpose. My concern is that the representatives of the EPA may not have given serious attention to the argument, and may have been "going through the motions" of holding a public hearing solely to satisfy the record. I hope that is not the case.

A great many deficiencies in the impact statement were brought to the attention of the EPA. They were too numerous for me to recall, but the stenographer recorded them all. There is no point in my attempting to duplicate them here. Suffice it to say that in my view the statement must be reworked. This project is too important to those of us who reside in southern Prince Georges County not to do a complete and thorough job. Then it must be republished and another public hearing held. In the meantime, I would also request that EPA order the WSSC to stop operation of the sludge incinceraors and stop any action now being taken to construct the pipeline, further additions to the plant and force mains which would be used to send sewage to an expanded plant.

Thank you for your attention.

Sincerely,

Harold A Williams

Harold A. Williams, President
Warburton Manor Citizens Association

Daniel J. Snyder III, Regional Administrator
c/o Director of Public Affairs
Environmental Protection Agency, Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

Subject: Impact Statement on Expansion of Piscataway Waste Treatment Plant

The impact statement mentioned above has many serious deficiencies which must be corrected. The statement says practically nothing about the long-range impact of plant expansion on the residents of the immediate area of the plant. The real effect of increased air pollution on my lungs was not mentioned. The discussion of water quality was unintelligible. What I want to know is, will I be able to swim in the bay? Will expansion of the plant spur uncontrolled growth in the area, taxing already overcrowded facilities?

There are other deficiencies. The statement recommends construction of an effluent pipeline which could serve a 152 mgd plant, denies vehemently that this constitutes endorsement of the future use of this facility to full capacity, while justifying the WSSC expansion to 30 mgd Advanced Wastewater Treatment on fact that, as facilities are there, they must be used. Do you expect us to believe that this same reasoning will not be used again when the next expansion is studied? The statement bases a cost comparison of land treatment of sludge to incineration of sludge on unrealistic data heavily favoring incineration. Also, the economic benefits of conserving and creating resources rather than burning them are ignored. The statement that incineration is tested and reliable is completely unsupported.

This statement must be reworked to correct the deficiencies mentioned. This project is too important not to do a complete and thorough job. In the second draft, this project must be considered as the first phase in a planned expansion of the plant to 152 mgd. This is necessary as it conforms to stated WSSC intent, resolutions of the County Council, and the recommendation for an 108" effluent pipeline. The statement must be republished and another public hearing held. In the meanwhile, EPA should order WSSC to stop operation of the sludge incinerators and stop any action now being taken to construct the pipeline, further additions to the plant, and force mains which would be used to send sewage to an expanded plant.

[illegible]

[illegible]
13414 [illegible]
[illegible]

Route 1 Box 214
Accokeek, Md.
March 15, 1974

Mr. Robert J. Blanco, P.E.
Chief, Environmental Impact Branch
U. S. Environmental Protection Agency, Region 3
6th & Walnut Street
Philadelphia, Pa. 19106

Dear Sir:

I am a former teacher, now a counselor in the school system; still an educator. In the schools today, we are very concerned with education and preparation for the future and to be realistic, one of our goals is survival in a world of pollution.

The schools have a fine publication to use when they develop programs that study pollution problems in our environment and also point out some of the possible solutions. The name of this guide is
"Environmental Protection Action Guide for Neighborhood Programs
Prince George's County, Maryland
Department of Human Resources and Community Development
Community Action Committee
Funded Under Public Law 91-516, Environmental Education Act of 1970."

On Page 25, is a section called: "The Law is On your Side."
"Yes, there are County ordinances to protect us ~~fr~~ from pollutants and from unhealthy condtions. Included are parts of some County ordinances relevant to environmental protection.

A. Air Pollution Control Ordinance

1. No incinerator or source shall be constructed or operated in such a manner that the smoke density from the stack shall exceed No. 1 on the Ringelmann Chart for sustained periods.

6. No person shall cause or permit any materials to be handled, transported or stored in a manner which allows or may allow particulate matter to become airborne."

How can we teach this when you are ready to fire inccinerators on Piscataway Bay--when reports are out that state it is one of the most dangerous things that can be done. Evidence given by many at the meeting March 7 stated there are better ways to get rid of studge. I will not go into them; you already know them.

13613 Piscataway Drive
Oxon Hill, Maryland 20022

March 19, 1974

Daniel J. Snyder III, Regional Administrator
℅ Director of Public Affairs
Environmental Protection Agency, Region III
6th & Walnut Streets
Philadelphia, PA. 19106

Dear Mr. Snyder:

Subject: Impact Statement on Expansion of Piscataway Waste Treatment Plant

The impact statement mentioned avove has many serious deficiencies which must be corrected. The statement says practically nothing about the long-range impact of plant expansion on the residents of the immediate area of the plant. The real effect of increased air pollution on my lungs was not mentioned. What I want to know is, will I be able to swin in the bay? Will expansion of the plant supr uncontrolled growth in the area, taxing already overcrowded facilities?

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Sincerely,

Mrs. Gerald Fratantuono

We also beg you not to expand the plant at Piscataway Bay. This was to have been a model plant only to handle 5mgd. The people in the Southeast area of Washington, Oxon Hill and Accokeek, Maryland have long enough been the garbage dump of the metropolitan area. I was appalled to hear that members of the Montgomery County Council were present advocating expansion of the plant to 94million mgd. What chutzpah! Gall, that is, they haven't handled one oz of sewage nor sludge-We resent this and deplore their recommendation.

Please do not harm us.
Please do not pollute the environment.
Please do something-dont't burn, don't expand the plant.
There are better ways. You know them--Lake Tahoe, for one. Please,,,,

Sincerely

Edna Henderson

cc: Governor Mandel
Congresswoman Holt
William Gullett, Prince Georges County Execuktive

602 Pine Road
Oxon Hill, Md. 2 022
March 16, 1974

Daniel Snyder III, Regional Admin.
c/o Director of Public Affairs
Environmental Protection Agency, Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

Subject: Impact Statement on Expansion of Piscataway Waste Treatment Plant

The impact statement mentioned above has many serious deficiencies which must be corrected. The statement says practically nothing about the long-range impact of plant expansion on the residents of the immediate area of the plant. The real effect of increased air pollution on my lungs was not mentioned. The discussion of water quality was unintelligible. What I want to know is. will I be able to swim in the bay? Will expansion of the plant spur uncontrolled growth in the area, taxing already overcrowded facilities?

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Sincerely,

Mrs. Ronald Kagarise
Ronald E. Kagarise

[illegible]
4/2/74

Mrs. Sharon Wright
13215 Piscataway Drive
Oxon Hill, Maryland 20022

March 19, 1974

Director of Public Affairs
EPA Region III
6th and Walnut Street
Philadelphia, Pennsylvania 19106

Gentlemen:

Please help us protect our Environment! Stop the Piscataway Sludge Incinerator!

We know they are polluting the environment. We know it is hazardous to our health. We are quite sure there are other and better alternatives for sludge disposal that would help us rather than hurt us.

Some of us have already had our bodies and those of our children tested for lead levels and they are dangerously high.

We are being used as gunica pigs and we did not volunteer.

How can this happen in America?

Very truly yours,

Sharon Wright

Parent Teachers Association
EUGENE BURROUGHS JUNIOR HIGH SCHOOL
LIVINGSTON AND BERRY ROADS
ROUTE 2 BOX 319
ACCOKEEK, MARYLAND 20607

March 24, 1974

Director of Public Affairs
Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Sir:

The Executive Committee of the Eugene Burroughs Junior High School PTSA has voted unanimously to request that the sludge incinerator at the Piscataway Sewage Treatment Plant be shut down immediately. Since the Environmental Impact Statement prepared by the Environmental Protection Agency does not even mention the effect of this burning on human beings, even though your own figures state that well over 70 tons of emissions will be generated a year, including 5 tons of lead alone, and since some of the children living near the plant have been tested and found to be in the early stages of lead poisoning, we feel it is unconscionable to continue this burning.

Eugene Burroughs is located 1¼ miles from the Piscataway Plant, and we cannot sit by and see our children exposed to this danger any longer. At the very least, if this incinerator is not shut down, we insist that the children be tested on a monthly basis to determine lead concentration in their bodies. We urge that all necessary steps be taken immediately to relieve our children from this danger before tragedy strikes. Further testing of the effects of sludge burning should be made in laboratories, not on human beings.

We request that this letter be made part of the record of the hearing of March 7.

Sincerely yours,

Erica G. Kenney, President, PTSA
Eugene Burroughs Junior High School

[illegible]

805 Tantallon Drive
Oxon Hill, Maryland 20022

March 25, 1974

Director of Public Affairs
Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Sir:

In behalf of the parents, teachers, and especially the students of Harmony Hall Elementary School, I would like to enlist your immediate assistance in stopping sludge incineration at the Piscataway Sewage Treatment Plant.

The original impact study prepared by EPA, estimated this plant, burning sludge, would generate over seventy tons of emissions a year, of which five tons would be lead.

I don't think I have to tell you what an insidious killer lead poisoning is. Over the past several years, federal, state and local governments have spent millions of dollars trying to eliminate causes of lead poisoning in children - from paint to auto emissions. Now it appears we have a government activity with a new way to cause it.

Several families in the Piscataway area have had their children tested, and all test results show an abnormally high lead level. Two cases were actually in the early stages of lead poisoning.

A lot of our Harmony Hall students live in this "fall out" area, and somebody has got to help them before we have brain damage or fatalities.

The sludge burning should be stopped immediately and a complete restudy made. Just what was supposed to happen to that five tons of lead?

Your help and support in this very serious matter will be most appreciated.

Sincerely,

Joseph J. Mecer, President
Harmony Hall PTA

JJM:do

Acknowledged 2- 4/6/77

13102 Ochang Rd.
Oxon Hill, Md.
March 31, 1977

Director of Public Affairs
EPA, Region 3
6th and Walnut St.
Philadelphia, Pa. 19106

Dear Sir:

We are writing concerning the incineration of sludge at the Piscataway Sewage Treatment Plant in Oxon Hill, Maryland. We live in the area immediately surrounding the plant are growing increasingly concerned about the air we are breathing. Recent tests done on local residents at Children's Hospital in Washington, D.C., show alarming levels of lead in their blood. And all but one were children. There are some 2500 school-age children here all being exposed to deadly poisoning, not to mention all the many pre-schoolers.

The EPA's own figures recently released show that we will get about 5 tons of lead a year spewed into the atmosphere from the incinerator at the Piscataway Sewage Treatment Plant.

We feel the sludge incineration is not only a dangerous health hazard, but a very wasteful action as well. The sludge could be converted into fertilizer, as is being done on a small scale in the District of Columbia.

We do NOT want the incinerator in our area and urge you to bear in mind as you look in to this situation, the future of all the people here, especially the children.

Sincerely,
Mr. & Mrs. W. R. Buterbaugh

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Emeritus

March 5, 1974

The Administrator
Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Dear Sir,

Please be advised of our interest and support for the installation of the necessary outfall line, into the Potomac River, from the Piscataway treatment plant, situated in Prince George's County.

We understand that approval from the E.P.A. is necessary for the desired installation.

The installation of the outfall line is essential to the continued orderly growth and development of this County. County development is being hampered by inadequate treatment facilities and disposal methods. We deem it vital to the County's development and progress that permission for this installation be granted.

Thank you for consideration of our position and we look forward to relief from the much delayed approval for installation of the outfall line.

Very truly yours,

John H Hughes

John H. Hughes
President

JHH/jhm

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ELMER MOSTOW
(D.C. BAR)

WASHINGTON OFFICE
SUITE 600
1150 SEVENTEENTH STREET, N.W.
WASHINGTON, D.C. 20036
(202) 872-9080

March 11, 1974

Director of Public Affairs
EPA, Region 3
Curtis Building
Sixth and Walnut Street
Philadelphia, Pennsylvania 19106

RE: Piscataway Outfall Line - Environmental Impact Statement - Prince George's County, Maryland

Dear Sir:

This office represents Hyman Bernstein, a property owner in Prince George's County, whose land lies within the sewer service area of the Piscataway Treatment Plant. Mr. Bernstein has been unable to obtain public sewer service to his property notwithstanding that land on all sides of him is fully developed, the reason for the denial being the alleged lack of treatment capacity at the Piscataway Plant.

I appeared at the EPA public hearing on March 7, 1974, but unfortunately, time did not permit me to make an oral presentation on behalf of my client, and accordingly, I am submitting herewith written comments in support of our position. The approval of the outfall line will have the effect of permitting the Piscataway Plant to operate at its full capacity of 30 mgd and thereby will permit Mr. Bernstein and others similarily situated to reasonably use their properties and have public sewer service available. It is unfortunate that many of the speakers at the March 7 meeting did not acknowledge that an individual has a constitutional right to the use of his property, but that right is so elementary, that I will not dwell on it further in this letter.

I firmly believe that the Washington Suburban Sanitary Commission, the Prince George's County Government and the Environmental Protection Agency share with my client the opinion that the protection of our environment is of paramount importance, and that private interest must suffer inconveniences to achieve this

Director of Public Affairs
March 11, 1974
Page Two

protection. That is not the issue in this matter, and as proof of my client's willingness to assume this inconvenience, I repeat that he has been unable to utilize the property since 1970, when the first moratorium order was declared in the Piscataway Basin. The delay in obtaining the use of his property has been extremely costly, but,as I say, that is a burden which he has assumed to afford public officials the opportunity to provide the necessary treatment facilities to protect the health, safety and welfare of the citizens of the area. The time is upon us when the government must now act in the public good so that the burden on the private interest is lifted. For that reason, and because I firmly believe that the health, safety and the welfare of the community is adequately protected with the system as proposed at Piscataway including the 108 inch outfall line, I urge EPA's approval as proposed.

I would suggest, however, that if it is possible to eliminate incineration as a means of disposal of the sludge, and substitute in lieu thereof, a land-fill system, then that change be made. This suggestion, however, presupposes that the substitution can be made without undue delay in completing the project.

In conclusion, I urge that EPA's action on the environmental impact statement be expeditious so that the extreme burden which has been assumed by my client and other builders can be lifted. The continuing increase in the unemployment in the metropolitan-Washington area among building trades must be abated and only through actions such as this is that possible.

Very truly yours,

LINOWES AND BLOCHER

Charles G. Dalrymple

Charles G. Dalrymple

CGD:mm

cc: Dr. Peterson
Irving Bernstein

3214 Branch Avenue, S.E.
Silver Hill, Maryland 20031

March 11, 1974

Mr. Robert J. Blanco
Chief Environmental Impacts Branch
EPA Region III
Curtis Building
6th and Walnut Streets
Philadelphia, Pa. 19106

Re: Draft Environmental Impact Statement
(EIS) Piscataway Treatment Plant

Dear Sir:

On Thursday March 7, 1974 I attended the public hearing on the above referenced Draft Environmental Statement. Not being experienced in these matters and having rather short notice, I did not testify at the hearing. In fact, none of the proponents of the upgrading and expansion of the plant were able to be heard as the opponents had already reserved the first five hours of testimony time. Since the first few speakers each exceeded his or her allotted fifteen minutes it was obvious that no proponents would be heard. I saw them leave in considerable numbers.

One more comment before I state my opinion -- although forewarned, I was nonetheless surprised and ashamed of vicious and completely irresponsible testimony of some of my neighbors -- mostly professional activists. I would hope that your representatives would not conclude that this was a cross section of Piscataway Valley residents -- nothing could be farther from the truth.

I would like to state my unqualified support for the earliest "upgrading and expansion of the WSSC Piscataway Wastewater Treatment Facility" for the following reasons:

1. The population of the Metropolitan Washington area is growing at a rapid rate. There is no realistic way to stop this growth. It is inexorable; Wastewater treatment plants throughout the area are already overloaded. And while the stalemate an additional treatment capacity continues, more and more untreated and undertreated sewage is being dumped into our rivers and streams.

The opponents your people heard at the hearing are not primarily interested in how the plant is to be operated. Their consuming desire is that it not operate at all. But they're dreaming -- if the capacity of this and other plants in the area are not upgraded, a great deal of damage to our environment will occur. Sewage flows are and will be increasing for the foreseeable future.

2. Although I am not a developer, it doesn't take any special knowledge to see that the Washington area depends on two and only two sources for livelihood, government and those goods and services to support the base population of government people. This latter activity has been seriously impaired for the last four years mostly by reason of lack of sewer capacity.

Most of the criticism of the Draft EIS the other night seemed to be centered around the alleged lack of efficacy of the Piscataway Wastewater Treatment Plants' incinerators. Perhaps the activists consider this the weakest point in the EIS. I cannot speak to this point.

There was an alternative mentioned several times with which I do agree-- land disposal of the sludge. You are aware, I am sure that a horrendous amount of energy is required in the manufacture of fertilizers, primarily nitrogen. Accordingly the price of fertilizer has more than doubled in the last six months. A yard of sludge contains more organic nutriments than a ton of 5-10-5. In addition sludge is all humus. A one inch layer of sludge on a field will provide more humus than can be provided by ten years of cover crops. This is instant reclaimation of worn out land. There can be no higher objective!

In summary, gentlemen, the testimony you heard the other night was at best misguided.

1. The best way to protect our environment is by expanding sewer capacity. The people are coming. To delay invites disaster.

2. The best way to protect the people of this area is to give them jobs. The only way to enhance the lot of the poor and the young of the area is by reviving the sector of the economy that is hurting the most. This can only be done by resuming normal growth.

3. And finally, the outfall line and the sludge disposal must be solved immediately. We are in danger of studying these problems to death. I favor land disposal for the sludge.

Gentlemen, you have the opportunity to solve a major problem for our people. Please do not procrastinate any longer.

Yours very truly,

Jim B. Bock

Jim B. Bock

JBB/s

(301)839-9090

Chas. E. Campbell
LAND DEVELOPER · ENGINEERING
8724 E. FORT FOOTE TERRACE
WASHINGTON, D. C. 20022

April 2, 1974

Robert J. Blanco, P.E.
Chief, Environmental Impact Branch
Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

After the recent hearing at Oxon Hill High School in reference to Piscataway Sewage Plant and incinerator your organization mailed to me your report on that situation which I have had an opportunity to peruse, and I don't believe that I could make any definite changes or suggestions in reference to the plant or operations. I inspected the incinerator and I see nothing particular wrong with it except perhapd you will need some adjustment, which always happens in new plants.

Since the meeting however, I see that the local citizens and some politicians have taken it upon themselves to spread information about the amount of lead that is coming from this plant. As I understand it, there is less than 100 hours plant operation there, so under these circumstances I am positive that those people who have made the statements with reference to the plan are in error. When I visited the plant it was in operation and the only thing that I saw coming from it was steam.

I only have one complaint, which has nothing particular to do with the equipment at Piscataway, and it is that your organization has taken too long a time to approve the out-fall line from the disposal plant to the Potomac River.

Any information that you can furnish me in reference to when you will issue a permit to build this line will be appreciated.

We in the neighborhood need this service very badly.

Respectfully yours,

Charles E. Campbell

ep

C. Public Hearing

EPA held a Public Hearing on March 7, 1974 at Oxon Hill High School, Oxon Hill, Maryland. The purpose of the Hearing was to receive testimony from all interested persons concerning the Piscataway Draft Environmental Impact Statement.

Twenty-four persons testified at the Hearing, producing a 118-page transcript. In order to conserve paper, a summary of each statement was made, and appears below in the order received. Only constructive, critical comments appear in these summaries. The entire transcript is, however, available for public review at the EPA Region III office in Philadelphia. When persons who testified also presented written statements, the written statement is reproduced and responded to in Section VI.B. Those who testified are as follows:

Mr. Steven A. Torok, EPA
Dr. James Comaus, Health and Sanitation Chairman, Forest Heights, Md.
Mr. Julian Holmes, Prince George's Citizens Charter Commission
Mr. James Rapace, Air Pollution Committee, Prince George's Environmental Coalition
Dr. Gordon Anderson
Mr. David Elliott, Vice Chairman, WSSC
Ms. Charlotte P. Ganett, President, Montgomery Environmental Coalition
Mrs. Marion K. Agnew, Center for Environmental Strategy (speaking also for Rhea Cohen, P.G. Environmental Coalition)
Mr. James Beek, Lung Association of Southern Maryland
Mr. James Davis, Office of the Prince George's County Executive
Mrs. Jo Hannah Norris, Commissioner, WSSC
Mr. David Sober, Office of the Montgomery County Executive and County Council
Mr. Edwin M. Shaffrey, Prince George's Chamber of Commerce
Mr. William Moran, President, Mayaone Association
Mr. Charles Weller
Mr. Benjamin Swan
Mr. M.M. Enyedy, Chairman, Tantalyon Citizens Association Zoning Committee
Mr. David Weltz, Piscataway Hills Citizens Association

Mr. James Spart, President, Piscataway Hills Citizens Association
Mr. Robert Ruskin, President, Alice Ferguson Foundation
Mr. Robert W. Lowe, Vice President, Suburban Maryland Homeowners Association
Ms. Beth Trotto
Mr. Lee Clayman
Mr. Joseph McCaffrey
Ms. Ann Shock, Washington Citizens Association
Mr. Richard Waller
Mr. Charles Campbell

STATEMENT BY STEVEN TOROK

ENVIRONMENTAL IMPACT BRANCH

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION III

Public Hearing on the Draft Environmental Impact Statement for the upgrading and expansion of the Washington Suburban Sanitary Commission Piscataway Wastewater Treatment Facility to 30 MGD AWT

March 7, 1974

My name is Steven Torok. I am a representative of the Environmental Impact Branch of EPA Region III. Recognizing that any summary is necessarily incomplete, I would like to describe briefly the Draft Environmental Impact Statement for the Washington Suburban Sanitary Commission's proposed upgrading and expansion of the Piscataway Wastewater Treatment Facility to 30 million gallons per day, advanced wastewater treatment.

WSSC has applied to EPA for a federal grant to assist in the construction of an advanced wastewater treatment addition to the existing Piscataway 30 million gallons per day secondary wastewater treatment facility, and for the installation of approximately 18,000 feet of 108-inch diameter effluent pipe. The proposed AWT additions would be located adjacent and southwest of the existing secondary facilities and within the existing facilities' perimiter fence.

The 108-inch effluent pipe would run in generally a westerly direction from the wastewater treatment plant, through Piscataway Park, parallel and approximately 2000 feet inland of the Piscataway Bay Shoreline, to a point located in the main channel of the Potomac Estuary approximately 2500 feet due west of Mockley Point.

The applicant's proposed advanced wastewater treatment addition is designed to upgrade the secondary effluent and convert it to a high-quality AWT effluent which would meet or exceed the Potomac River Enforcement Conference recommendations of 96 percent biochemical oxygen demand and phosphorous removal and 85 percent nitrogen removal.

Installation of the effluent pipe would change the discharge point from its present location in the Headwaters of Piscataway Bay to the Main Channel of the Potomac Estuary. This effluent pipe would expand the allowable discharge of the Piscataway Facility form the current 17 million gallons per day, thus allowing full utilization of the existing facility.

Sludge generated from the treatment facility is expected to be incinerated in the existing Piscataway incinerators, with the residual ash deposited as landfill.

The primary purpose of the proposed upgrading and expansion is to meet requirements of the Potomac River Enforcement Conference established to hasten the clean-up of the Potomac River and its tributaries.

In general, the applicant's proposed project would remove health hazards and water quality problems which are presently being created by discharges from Andrews Air Force Base and the Naval Reservation into tributaries of Piscataway Bay, and would assure adequate sewage treatment in the Piscataway and Henson Creek Basins. On the other hand, it would create short-term construction nuisances.

By category, the applicant's proposed project would have the following impacts:

1. Water Quality: There would be favorable impacts on Tinkers Creek and also on Piscataway Bay but to a lesser degree, since increased nutrients and BOD will continue to enter the Bay from the Potomac Estuary. The impact of the effluent on the Potomac Estuary at the discharge poing would be minimal.

2. Air Quality: No appreciable degradation to ambient air quality would result from the added incineration load at Piscataway. Sulphur dioxide and carbon monoxide emissions would be negligible. Essentially all organic compounds would be destroyed, and neither atmospheric emission nor residue ash would present any potential source for contamination from pathogens. Research into the range and toxicity of particulates and heavy metals is continuing at EPA and by Battelle Institute, a consultant retained by WSSC.

3. Natural Resources: Short-term construction impacts on vegetation and wildlife would result along the route of the proposed effluent pipeline and on the Piscataway Site. In addition, a temporary impact to the aquatic biota would result from dredging for the outfall line in the Potomac River.

The proposed project involves the commitment of construction materials, chemicals, electrical power, and fuel oil for operation. In light of the current shortage of energy, WSSC has been instructed to develop a contingency plan for alternative sludge disposal methods.

4. Land Use: The proposed project would not, by itself, commit or preclude development patterns in its design or potential service areas: those patterns will be determined largely by future decisions on primary and collector sewers, transportation facilities and county land use planning.

5. Historic: The proposed effluent pipe, in crossing Piscataway Park, offers the potential of damaging historic and esthetic values. However, there would be strict construction conditions and precautions taken to prevent irreparable damage.

In accordance with NEPA requirements, a number of alternatives to the proposed action have been evaluated. These include the following:

1) The No-Action Alternative

2) Location of AWT Facilities elsewhere

3) Construction of smaller decentralized wastewater treatment facilities throughout the design service area.

4) Conventional alternatives for achieving AWT

5) Land Treatment

6) Alternatives to sludge treatment and disposal

7) Alternatives to effluent disposal

This draft Environmental Impact Statement has been filed with the President's Council on Environmental Quality, as required by the National Environmental Policy Act, and circulated among interested Federal, State, and Local Agencies and other interested parties. A list of the initial circulation is included in the Draft EIS. Thank you.

Dr. James Comaus, Health and Sanitation Chairman, Forest Heights, MD:

1. The Draft EIS, especially regarding incineration, is inadequate; lack of discussion on the efficiency and emissions from the incinerators. A dispersion analysis of emissions should be presented.
2. Further study is needed regarding emission of heavy metals, e.g., mercury and beryllium, and their effect on public health. EPA has neglected these potential hazards.

Response: See written comments, Section VI.B.

Mr. Julian Holmes, Prince George's Citizens Charter Commission:

1. EPA has allowed 17 mgd of effluent to be discharged from a 15 mgd plant into Piscataway Bay. This discharge, not the Potomac River, is polluting the Bay.
2. EPA is already committed to a 350 mgd Piscataway facility, as evidenced by the proposed 108-inch outfall pipe.
3. "Artificial" growth in the D.C. area has resulted in the heavy sedimentation of the surface waters.
4. A study should be presented on the effects of the Piscataway facility on fish and wildlife.
5. EPA is already committed to WSSC's proposed project prior to the NEPA review process. Land treatment alternatives are being ignored.
6. The dangers of using large amounts of chlorine have not been discussed.
7. The Draft EIS was written by WSSC, rather than EPA.

Response:

1. The existing Piscataway Treatment Facility has a design capacity of 25 mgd for secondary treatment and 5 mgd for advanced wastewater treatment (5 mgd pilot plant). EPA Region III gave conditional approval to increase the allowable discharge to Piscataway Bay from the Piscataway Treatment Facility (see Appendix K). The conditional approval indicated that if the water quality of the Bay was degraded beyond current levels, increased flows would be discontinued. As of this writing, the effects of the increased discharge have not been determined. Studies have shown that the water quality of the Potomac Estuary is the major factor

in determining the water quality of Piscataway Bay. However, it is true that the water quality of the upper bay is dependent upon treated wastewater discharges from the Piscataway Treatment Facility, and other treatment plants tributary to Piscataway Creek.

2. EPA is not committed to expanding the Piscataway Treatment Facility beyond 30 mgd. Any proposed expansion of the Piscataway facility will be subject to a NEPA review. The decision to construct the 108-inch effluent pipe was based on the high potential for expanding the Piscataway facility in accordance with proposed state plans, and environmental and economical considerations (see III.G., Alternative-Effluent Disposal).
3. Any new growth has the potential for increasing sedimentation of surface waters. Whether or not "artificial" growth has resulted in heavy sedimentation of surface waters is conjecture.
4. The environmental effects of the Piscataway facility have been evaluated in the EIS. (See IV.B., Environmental Impacts of the Proposed Action)
5. EPA is not committed to a particular wastewater treatment scheme to achieve advanced waste treatment or wastewater renovation. The land treatment alternative was evaluated (see III.D., Alternatives-Land Treatment).
6. The EIS has been revised and the dangers associated with chlorine usage have been discussed.
7. The EIS was prepared by EPA. The applicant, WSSC was required to submit significant amounts of information concerning the project. This information represents a portion of the data used in preparing the Piscataway EIS.

Mr. James Rapace, Air Pollution Committee, Prince George's Environmental Coalition:

1. A comprehensive particulate emission chemical analysis should be performed for the sludge incineration system. All harmful elements should be identified quantitatively.
2. 30 mgd capacity cannot even handle existing wastewater flows in the service area. Sludge production was therefore substantially underestimated.
3. The emission calculations in the Draft EIS assume a 99.9 percent removal efficiency. This grossly underestimates particulate emissions.

4. Large amounts of many hazardous pollutants will be emitted into an air basin that is not conducive to atmospheric dispersion. In connection with a study done by Mr. Rapace on Blue Plains, a measurable increase in stomach cancer and respiratory disease can be expected (caused by topography and meteorology). The incineration of sludge is also not consistent with national policy, as expressed in P.L 92-500. Land disposal alternatives should be seriously considered. (Mr. Rapace's detailed written statement is printed in its entirety in Section VI.B.).

Response: See Section VI.B.

Dr. Gordon Anderson:

1. EPA is disregarding national policy, as expressed in P.L. 92-500, in recommending AWT rather than land treatment of sewage effluent. Cost estimates for land treatment in Chicago differ from the analysis in the Piscataway EIS. Studies on land availability should not be limited to Prince George's County.
2. EPA has ignored important studies on the use of land-based treatment systems, e.g., EPA-430/9-73-006 "Survey of Facilities Using Land Application of Wastewater." This report contradicts the EIS' claim of health hazards in land treatment alternatives.
3. Capital cost estimates for the proposed Montgomery County facility are substantially higher per mgd than those claimed for Piscataway. Why is the Piscataway figure lower?
4. Land treatment systems generate revenues which pay for much of the operating costs. This should be considered in the analysis of alternatives. (Dr. Anderson's detailed written statement is printed in its entirety in Section VI.B.).

Response: See Section VI.B.

Mr. David Elliott, Vice Chairman, Washington Suburban Sanitary Commission:

1. The location and design of the Piscataway facility is compatible with the goal of restoring the Potomac River and will be a model for other states. Advances in treatment technology are making it possible to accommodate the recent high growth in the D. C. area without degrading the natural environment.

2. The two proposed projects--upgrading to AWT and construction of the outfall line--must be constructed if the current Piscataway facilities are to be used at the 30 mgd capacity.
3. "WSSC will continue to respect all constructive suggestions of all interested parties now and throughout our endeavor."
4. The public interest, perhaps, may have been better served if original planning and design had been for a form of land treatment (this comment was not made as a representative of WSSC).

Response:

1, 2, and 3. None required.

4. Considerably less public controversy may have been generated if land treatment had been fully evaluated during the original planning process. However, it should be noted that no adequate site for land wastewater treatment has been found.

Ms. Charlotte P. Ganett, President, Montgomery Environmental Coalition:

1. In order to make sensible decisions about the Piscataway facility's pollution loading, EPA should assess for the entire D.C. area the pollution loadings established for the various zones of the Potomac River. In a related issue, the proposed Anacostia Force Main should be considered, as it would decrease the loading in Zone I from Blue Plains.
2. Serious consideration should be given to alternatives to chemical AWT; such alternatives can "save" the Potomac Estuary and Piscataway Bay.

Response:

1. In evaluating alternatives for effluent disposal (III.G.), the EIS has been revised to indicate the effect of Zone I loadings on Zone II. In this evaluation, it was assumed that projects eliminating raw sewage overflows would be completed.
2. Alternatives to chemical AWT will be evaluated and implemented when feasible.

Mrs. Marion K. Agnew, Center for Environmental Strategy (speaking also for Rhea Cohen, Prince George's Environmental Coalition):

1. The scope of the EIS should have included both the Blue Plains and Piscataway treatment plants and the related conveyance system. Further, projects should not be considered until an Areawide Waste Management Plan (Section 208) is developed for the entire D.C. area.
2. The present proposed project should be considered as a Treatment Works Segment, under EPA Construction Grant Regulations. A new EIS should be prepared on the Blue Plains--Piscataway Facilities Plan (Section 201) and the Piscataway Treatment Works Segment of that plan.
3. Provisions of the FWPCA Amendments of 1972 (P.L. 92-500) require the study of all alternative treatment methods and the selection of the best, practicable, and most cost-effective alternative "over the life of the works." The Piscataway EIS contains a misleading alternatives analysis, which is biased in favor of the proposed method. Further, operation and maintenance expenses have not been discussed, although these costs clearly favor land treatment.
4. Fifteen questions are asked concerning costs, treatment efficiency, land treatment, infiltration, water reuse, sludge disposal, and incinerator emissions. Because of their length and specificity, they are reprinted in their entirety below:

> (1) What base figure is used to determine the cost of fuel oil and electricity in you cost estimates? Include a projection of these figures "over the life of the treatment works." for both chemical AWT and land treatment.
>
> (2) Where has a plant been built that reflects the optimistic predictions for nitrogen removal cited in table 24, page 130 of the Draft? What are the test results for removal of nitrogen from the pilot plant at Blue Plains? Include these with the Draft.
>
> (3) Explain the table on page 10 which indicates that as t flows at Piscataway lessened, the performance of the plant got worse. Plants usually get better in the summer, Piscataway got worse. Why has the plant been performing badly? Why have you failed to include results since July of 1973?

(4) Since the infiltration rate to the Blue Plains System from WSSC is now estimated about 50%, and since approximately 80 to 90% of the dwelling units and commercial units in Washington D. C. are still on combined sewers, and since Piscataway is being enlarged to treat the overflows from Blue Plains, explai how this systme will meet the requirements of Section 201(g)(4), FWPCA.

"The Administrator shall not appro.e any grant after July 1, 1973, for treatment works under this section unless the applicant shows to the satisfaction of the Administrator that each sewer collection system discharging into such treatment works is not subject to excessive infiltration."

(5) Can the existing secondary facilities be used to treat peak stormwater flows by pumping the daily flows out to a land treatment facility? Would this eliminate the necessity to give only primary treatment to peak storm flows?

(6) Since 80% of Prince Georges County soils are suitable for cultivation and pasture (p. 33) what is your reason for stati that, "The existing geologic and soil conditions in the vicinity of the Piscataway Facility are not conducive to massive applications of effluent, etc." Define "massive", and the reason for this allegation; also, what is meant by "vicinity"? Does thi conclusion take into account the underdrainage that is a part of any well-engineered facilty?

(7) Can a land treatment fecility be used to alleviate the Washington Metropolitan Area's critical water problem by regulati the flow of the Potomac River? The American Public Works Association study prepared for EPA, SURVEY OF FACILITIES USING LAND APPLICATION OF WASTEWATER EPA-430/9-73-006, p.1., notes that, "land application of wastewaters can be considered as a part of a water reuse cycle, part of a dynamic system of utilization and conversion of the liquid and the nutrient components contained therein." "Recycling and reclaiming of water is a requirement in Section 201 FWPGA (g) (2) (b).

(8)~~10~~. Can solid waste disposal problems be solved by incorporating an orban ore mining operation into a land treatment facility? FWPCA, Section 201 (e)

(9)~~21~~. Can a power plant be sited on this land treatment faci ity instead of on the Potomac River and utilize its lagoons for cooling capacity? "To operate to produce revenues in excess of capital and operation and maintenance costs."om accordance wi Section 201(e), FWPCA.

(10)~~22~~. Can park and open space facilities be incorporated into the land treatment facility as described in the APWA report to EPA, page 2 sections 8 and 9., to meet the requirements of Section 201 FWPCA? I quote from the report:

> "A variety of beneficial uses are being made of wastewater effluents. Uses include irrigation of parks, golf courses, cemeteries, college grounds, street trees, highway median strips, sports grounds, ornamental fountains and artificial lakes. Wastewater effluents are also used to irrigate many types of crops including grasses, alfalfa, corn, sorghum, citrus trees, grapes, and cotton. Forest lands also are being irrigated in many areas."

(11)~~23~~. Have alternative carbon sources for the nitrification-denitrification process other than methanol been investigated? Since Methanol can be used as a fuel, it is logical to assume that it will be in short supply if available at all - and very expensive. Include present and projected costs of methanol and processes for providing the alternate carbon source.

(12)~~24~~. Has OSHA reviewed the high levels of lead and mercury i the vicinity of the proposed incinerator? Do health hazards exist from these two cumulative poisons for those who work in or near the plant?

(13)~~25~~. Can land treatment eliminate the discharge of pollutan into the Potomac River, the ultimate goal of FWPCA? The APWA study (p. 2) says: "Treatment of wastewater prior to land application has generally been dictated by the desire to use the best practical means consistent with available technology and to minimize any adverse effects upon the environment. Land application of wastwater by eliminating direct discharges of effluent into receiving waters could be regarded as satisfying the ultimate national policy goal of 'zero discharge' of pollutants."

Please explain why this important point is not given careful consideration in the Draft Statement.

(14)~~26~~. What is your source for statements on page 88 of the Draft about potential disease transmission and contamination of groundwater in land treatment systems? These problems are discussed in the APWA study, page 2.: "No instances of health hazards were reported from any existing facilities." page 4. "Observations in the field and surveys of land application systems did not reveal the existence of specific health hazards and disclosed very little concern over threats to the health of on-si workers, residents of neighboring areas, domestic animals or wildlife, or of those who consume or come in contact with land-applied wastewaters." The study does note the need for further re search into this matter. If it has not been done, what is the data source for your allegation noted above? EPA should sponsor a detailed study of health effects to get the real facts in this matter.

(15)~~27~~. What is your source for the allegation that Land treatment systems contaminate the soil and groundwater with notrogen build-up, on page 87 of the Draft? Page 25 of the AWPA Report sa "the ability of land application techniques to complete a nitrification-denitrification cycle can be utilized to prevent (groundwater concentrations that might exceed the safe levels of [N] in water for human consumption) as it is used in the spray runoff principle." "The fate of (N and P) can be regulated by proper practices to avoid serious effects on groundwater or surf. water sources." Please reconcile these statements with yours.

From the comments and questions noted above, its easy to see that a great deal of research and study must be made before any final decision is made to enlarge and upgrade the existing Piscataway facility. I ask only that the laws which have been passed by the Congress of the United States be allowed to function in the public interest, and that the Administrative agencies whose duty it is to uphold those laws do so to the very best of their ability.

Response:

1. Since the "related" conveyance is not part of this proposed project, a detailed evaluation of the interrelationship of the Blue Plains-Piscataway treatment plants was not included. The Piscataway EIS does address the potential expansion of the Piscataway service area to include the Anacostia Basin now tributary to Blue Plains, the impact of Zone I treated wastewater discharges on Zone II, and the ability of Zone II to assimilate potential increased wastewater discharges from the Piscataway facility. Since an Areawide Wastewater Management Plan (Section 208) is several years away from completion, delay of projects may not be practical. New projects will receive a full NEPA review. Implementation will depend on the findings of these reviews.
2. The Piscataway AWT project was evaluated with respect to the Draft State of Maryland Potomac-Metropolitan Area Basin Water Quality Management Plan (303e). Please note number 1. above.
3. The cost evaluation of the land treatment alternative has been revised. However, it should be noted that a suitable wastewater land treatment site was not found.
4. All of these concerns were evaluated and given consideration in the revision of the EIS. EPA's opinion and approach on these matters are clearly presented in the Final EIS.

Mr. James Beek, Lung Association of Southern Maryland, Inc.:

1. The sludge incineration process may introduce highly toxic pollutants into the atmosphere, e.g., Klebsiella, a bacterium which causes bacterial pneumonia (high mortality disease). The EIS should analyze the pathogens and other toxic pollutants to determine their potential effect on public health.
2. Lead emissions may cause irreversible damage in several disease varieties, e.g., lead anemia, lead encephalopathy, lead polyneuropathy. The EIS should analyze the potential effects of lead emissions.
3. Topography and meterology in the Piscataway area combine to produce conditions which will trap pollutants in frequent inversions.
4. The energy shortage may result in the use of higher-sulfur fuels. Further, using scarce fuel to destroy useful sludge makes no sense. Sludge can also be used to reclaim abandoned strip mines in Maryland.

Response: See Section VI.B.

Mr. James Davis, Office of the Prince George's County Executive:

1. The proposed upgrading and expansion of the Piscataway facility to 30 mgd AWT is to provide service only to the design service area. The EIS should be confined to this area and the land traversed by the outfall line. References to potentially servicable areas, beyond introductory remarks, should be deleted.
2. The potential health effects of incinerator emissions should be discussed in greater detail. The Battelle Study should be included in the final EIS.

Response:

1. EPA is required to address the potential expansion of the Piscataway treatment facility and the service area. The capacity of the proposed effluent line further emphasizes the need for this discussion.
2. The Battelle Study will be reported in full in a Supplement to this EIS.

Mrs. Jo Hannah Norris, Commissioner, Washington Suburban Sanitary Commission:

1. WSSC will restore all lands affected by construction of the plant and outfall line, and will comply fully

with all permit conditions of the National Park Service. Several years of study have resulted in an alignment with minimal terrestrial impact. Landscaping will continue at the plant site, in the Colonial motif.

Response: None required.

Mr. David Sobers, Office of the Montgomery County Executive and County Council:

1. Montgomery County supports the proposed project as a vital element in the regional wastewater management plan.
2. Montgomery County also supports expansion of Piscataway to 95 mgd at an early date. (The complete letter from the County Executive and Council President is reprinted in Section VI.B.).

Response: None required.

Mr. Edwin M. Shaffrey, Prince George's Chamber of Commerce:

1. The Prince George's Chamber of Commerce urges that the proposed expansion and upgrading of the Piscataway facility be completed without delay. It is needed to accommodate the population growth and the county's economic expansion needs.

Response: None required.

Mr. William Moran, President, Moyaone Association:

1. It is unclear what the ultimate treatment capacity at Piscataway will be; figures as high as 152 mgd are mentioned in the EIS. The County recently approved the purchase of land for an ultimate capacity of 340 mgd. The final EIS should place a top limit on the ultimate treatment capacity.
2. EPA should use whatever means of enforcement it has to ensure that WSSC, Maryland, and Prince George's County will be guided by the EIS findings.
3. The proposed 108-inch outfall line has a capacity of up to 540 mgd; this should not be permitted for a 30 mgd plant. WSSC should be required to post a bond to ensure environmental compliance rather than relying on effluent monitoring.

4. Sludge incineration should not be permitted; burning prevents reuse of sludge, uses scarce fuel, and pollutes the air.

Response:

1. The EIS has been revised to help clarify the projected wastewater flows. Any expansion of the Piscataway facility is dependent on a number of factors, such as wastewater flow allocations at Blue Plains, actual growth experienced, and environmental impacts. The Piscataway EIS, in discussing alternatives for effluent disposal, does indicate a maximum treated wastewater discharge from Piscataway under today's technology.
2. EPA will take appropriate action.
3. Alternatives to the proposed 108-inch effluent line are discussed in III. G. Compliance will be enforced through the National Pollutant Discharge Elimination System Permit.
4. A final commitment to use of the incinerators has not yet been made, pending the findings of the Battelle and University of Maryland studies. The Supplement to this EIS will discuss EPA's conclusions on sludge disposal.

Mr. Charles Weller:

1. A typographic error appears on page vi of the EIS.
2. The 108-inch outfall line has a capacity several times the proposed 30 mgd for the treatment plant. It also exceeds the level stated to be maximum allowable before degradation of the Potomac (95 mgd).
3. Sludge incineration should not be allowed. Rejection of land disposal is based on WSSC's desire to expand the treatment plant in the future.
4. The EIS is deficient in the discussion of toxic emissions and ambient air quality. Not enough is known about these to conclude that a serious environmental problem will not exist. Further, an illogical conclusion is made regarding the relationship between treatment capacity, incineration, air quality, and alternative means of sludge disposal.
5. The dangers of handling and storing large amounts of chlorine should be discussed in the final EIS.

Response:

1. This has been corrected.
2. The size of the outfall pipe is based on contemplated expansion plans of the State of Maryland, peaking characteristics of wastewater flows, economics, and the desire to minimize disruption to Piscataway Park and the estuary.
3. Land disposal of sludge is a contingency used by WSSC at least until the Supplement to this EIS is published.
4. Preliminary conclusions have been made regarding the potential threat of operating the incinerators. The purpose of the Battelle and University of Maryland studies is to provide definitive conclusions.
5. All necessary precautions will be taken and no problems are anticipated.

Mr. Benjamin Swan:

1. The EIS should discuss in greater detail the long-term availability of required chemicals and fuels. Future competition for these materials may increase costs, deplete supplies, or divert them to other uses. Definite alternative means of sludge disposal should be presented and be ready for implementation, if for any reason, oil-burning incineration must be abandoned.
2. Land treatment of effluent should be considered as an alternative to AWT.

Response:

1. A contingency plan for sludge disposal, should incineration be rejected for any reason, has been developed by WSSC and is discussed in Section III.E. See response #3 to the letter from the National Capital Planning Commission.
2. See Section III.F.

Mr. M. M. Enyedy, Chairman, Tantalyon Citizens Association Zoning Committee:

1. The proposed project "has no basis (and) no right to be built in the (proposed) area."

2. Not enough information is yet known to guarantee that operation of the Piscataway incinerators will not be harmful. Persons with allergies and respiratory problems are especially susceptible to the emissions. The project should be delayed until definitive research results are available.

Response:

1. EPA's opinion is adequately stated in the EIS.
2. Use of the incinerators for routine sludge disposal is indeed being postponed until definite research results are available.

Ms. Grace Biasinger, The Palisades Citizens Association:

1. Oppose use of Federal funds to assist P.G. County while P.G. County is default in its commitment to limit sewage flows to Blue Plains.
2. Funds should only be approved if funds to other responsible jurisdictions are not reduced.

Response: See Section VI.B.

Mr. David Weltz, Piscataway Hills Citizens Association:

1. Within one kilometer of the plant live 244 people; within two kilometers, 1000 people and three schools; within three kilometers, 7,350 people and 2,500 students. The EIS does not discuss how these people will be affected by the project.
2. The EIS does not identify possible contaminants in the sewage and the chemicals to be used.
3. The scope of the EIS-30 mgd AWT and the 108-inch outfall line- is too limited. The ultimate capacity of the plant should be the basis of the EIS. Further, the EIS implies that incineration is the long-term means of sludge disposal, when the plant is expanded again. The visual impact should also be considered, for example, of building incinerators to handle 350 mgd.

Response:

1. Preliminary conclusions in Section IV.B.4. and Appendixes A,B, and C should be consulted regarding air quality. Attachment 4, Appendix A should be

read concerning the proposed testing program.
2. The EIS does adequately address these points.
3. The proposed action is for a 30 mgd AWT and a 108-inch outfall line. The EIS does evaluate the potential expansion of the Piscataway facility and service area in accordance with the Draft State of Maryland Potomac River-Metropolitan Area Basin Water Quality Management Plan. The potential impact on water quality is discussed. Aesthetics has been an important consideration in the design of the entire facility. There is no long-term commitment, or even preference, to incineration when/if the plant expands.

Mr. James Spart, President, Piscataway Hills Citizens Association:

1. The EIS does not discuss the potential dangers from incineration emissions.
2. The EIS should evaluate the impact of plant which will require a 108-inch outfall line.
3. No action on the proposed project should be taken until the EIS resolves these questions.

Response:

1. The EIS does discuss these potential dangers, to the extent known prior to the Battelle testing and University of Maryland air quality study.
2. This evaluation is beyond the scope of the present EIS, although Section IV.B.2. does discuss water quality on a larger scale.
3. Final action on sludge disposal will not be taken until after publication of the Supplement to this EIS.

Mr. Robert Ruskin, President, Alice Ferguson Foundation:

1. The EIS does not discuss the impact of the outfall line on the environmental education program conducted by the Ferguson Foundation for school children in Prince George's and Piscataway Counties. Attention must be given to the fields and wetlands that will be affected by the pipeline and effluent. The temporary disruption caused by construction activities on the educational program should also be discussed.

2. The EIS fails to provide data on the frequency and severity of inversions and the related trapping of incinerator emissions. The topography and meteorology of the Piscataway site are not conducive to atmospheric dispersion. Mercury and lead emissions will be hazardous at 30 mgd and disastrous at 95 mgd. A contradictory conclusion concerning means of sludge disposal for a 95 mgd plant is found in the EIS.
3. The impact of 457 mgd of effluent--the capacity of the 108-inch outfall line-- should be addressed. 457 mgd from Piscataway will severly impact the Potomac; this should be faced now or a limit placed on ultimate expansion of the facility. Investment in the current proposal should not be used as a "locked-in" justification for continued expansion.
4. Land disposal of effluent, perhaps combined with an alcohol-producing fuel farm, can avoid the impact on the Potomac and the Ferguson Foundation. The figures used to reject land disposal are misleading.

Response: See Section VI.B.

Mr. Robert W. Lowe, Vice President, Suburban Maryland Homeowners Association:

1. In addition to the present project, the Anacostia Force Main and Pump Station and the Blue Plains Relief Sewer should be constructed at an early time. This would solve overflow problems being experienced.
2. Proper safeguards and advances in technology will prevent the problems discussed concerning the environmental education program, National Historical Farm and incinerator emissions. The real problem is improving the quality of the Potomac River.

Response: None required.

Ms. Beth Trotto:

1. More than 2,500 live and play within two miles of the Piscataway incinerator. Lead emissions in the air and that which settles into surface dirt may be ingested by the children, leading to lead poisoning. By the time symptoms appear, it's often too late to prevent irreversible damage or death. Operation of the incinerator is contrary to recent findings concerning lead effects on health.

Response:

1. EPA is concerned about the potential effects of sludge incineration on public health. We believe that the actions taken by EPA since release of the Draft EIS--and in the future--are responsive to this concern.

Mr. Lee Clayman:

1. The proposed project will cause long-term scarring of the land along the outfall line right-of-way and substantial degradation of water quality in the Potomac River. The EIS does not discuss the assimilative capacity of the River at the discharge point. Information should also be presented on the Potomac's hydrology.
2. Discharging at the proposed location will cause significant harm to aquatic biota, e.g., herring and rock fish.
3. The EIS does not consider the archeological and historic features to be important. The assertion that a benefit of building the outfall line is the exposing of archeological sites is ridiculous.
4. EPA should prepare the EIS and determine for WSSC where wastewater treatment facilities will be built.

Response:

1. EPA's review of the proposed project indicates that no long-term scarring of the land, no substantial degradation of the Potomac River water quality, and no significant effect on the hydrology of the Potomac River will occur as a result from the operation of a 30 mgd AWT plant at Piscataway. The assimilative capacity of Zone II of the Potomac River which will receive the Piscataway discharge is presented and discussed in the EIS.
2. The discharge of 30 mgd AWT water will have no significant effect on aquatic biota.
3. It was the intent of the draft EIS to indicate that construction of the outfall line would have no adverse impact on archeological features and minimal (if any) impact on historic sites. However, if new archeological sites are found as a result of the construction, some beneficial effects may be realized.
4. In accordance with existing Legislation, the planning of sewage treatment facilities is the responsibility of local governments.

Mr. Joseph McCaffrey:

1. The EIS is deficient in several important issues: Blue Plains, Anacostia Force Main, Blue Plains Relief Sewer.
2. The 30 mgd proposed capacity for the Piscataway treatment plant represents wastewater from 300,000 people. The design service area--Piscataway, Swan, and Broad Creek basins--has a much smaller population than this figure. Therefore, is the 30 mgd capacity intended for the design service area?

Response:

1. The proposed project consists of the construction of a 30 mgd AWT facility and a 108-inch outfall pipe. This is the main basis for the Piscataway EIS. It should be noted, however, that potential increases to the Piscataway service area and treated discharge flow are discussed in the Piscataway EIS. EPA has already completed an EIS for the Blue Plains treatment facility and all additional projects effecting these facilities will undergo a complete NEPA review.
2. The 30 mgd design capacity is based on population and flow projections in the design service area. Please consult Section II.H. of the EIS.

Ms. Ann Shock, Ft. Washington Citizens Association:

1. It is believed that athletes will be more affected by the incinerator emissions than non-active people. Many people in the Fort Washington area participate in active outdoor recreation.
2. The EIS should discuss in greater detail several topics: presence of viruses in effluent, chlorine treatment of effluent, haze in the region's air, toxicity of incinerator emissions, encouragement of denser population in the design service area, availability of public services to accommodate increased population, availability of fuel for incineration, the reliability of operational control for the incinerator, and the effect on parkland and Mt. Vernon. EPA should not fund the Piscataway project until these issues are resolved.

Response:

1. EPA will not permit operation of the incinerator unless it is determined to be safe for all persons, including athletes.

2. EPA has not evidence at this time to suspect that toxic materials will be emitted in sufficient quantity to cause a public health problem. Concerning haze in the region's air, the Piscataway incinerators control particulate emissions very well (over 99.9 percent). As discussed in Section IV, there is relatively small treatment capacity available for growth in the Design Service Area and secondary impacts on population and public services is not expected to be high. The availability of auxiliary fuel is discussed in the responses to the National Capital Planning Commission. See Section IV.B.4. and Appendix for the National Park Service's and Maryland Historical Trust's opinions concerning effects on parkland and Mt. Vernon.

Mr. Richard Waller:

1. The EIS should discuss the basis for EPA's decision to allow 17 mgd from the present secondary treatment facility directly to Piscataway Bay.
2. Constructing a 108-inch outfall line appears to be committing the Piscataway treatment plant to serving the potentially serviceable area, i.e., 159 mgd.
3. Incineration of sludge should not be allowed.

Response:

1. A discussion is presented in the EIS.
2. EPA does not regard the construction of the 108-inch outfall pipe as committing the Piscataway treatment plant to serving the potentially serviceable area. Please consult Section III.G. of the EIS for additional information.

Mr. Charles Campbell:

1. Although the incinerator will require adjustment to ensure efficient operation, there is nothing wrong in using it for sludge disposal.

Response: None required.

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APPENDIX A

SLUDGE INCINERATION

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The disposal of the sludges from the 30 million gallon/day (mgd) advanced wastewater treatment plant shall be via incineration, with subsequent landfilling of the ashes. The environmental impact of this alternative is chiefly on air quality; however, this impact is minimized through the use of high-energy scrubbing control equipment.

SECTION 1 - INCINERATOR DESCRIPTION

A. General Description

The incinerator will consist of 3 fluidized bed reactors, of which 2 are normally on-line and capable of handling all the sludges generated by the AWT plant at a 30 mgd flow. These sludges amount to 64,000 pounds/day (dry solids) from the primary and secondary treatment portions of the plant, with an additional 25,000 pounds/day from tertiary treatment bringing the total to 89,000 pounds/day (dry), or about 3,700 pounds/hour (#/hr). The third reactor will be held on standby for use during an emergency or during routine maintenance. The capacity of each reactor is 1,930 #/hr, dry solids.

B. Detailed Description

1. Incinerator Operation (Refer to Figure 1)

Raw sludge is generated by other portions of the waste treatment plant, which handles wastes from predominantly residential sources in the Washington, D. C. suburban area. This sludge is fed into the fluidized bed reactors where it is incinerated with the aid of auxiliary fuel (#2 oil). Combustion air is supplied from 3 sources: from inside the incinerator building, from the odorous areas of the sludge dewatering operation, and from vacuum pump discharges. The hot exhaust gases pass through a heat exchanger (air preheater) which will preheat the air entering the reactor to a minimum of 1000°F. Upon leaving the heat exchanger, the cooled exhaust gas will be cleaned in a high energy venturi scrubber operating at a 50" water gage pressure drop. Here, most of the particulate matter will be removed, as well as some gaseous compounds through condensation. The exhaust gas continues into a wet cyclonic collector which separates the water droplets and ash from the gas stream. The cleaned exhaust gas then passes into a cooler and a demister where further condensing of gaseous compounds and water vapor will occur. The gases now enter a stack and are discharged into the atmosphere.

The scrubbing liquids are recycled in the following manner: scrubber underflow shall be recirculated to wet cyclones (ash separators) and to the venturi scrubbers, while further on in the ash separating process the water shall be wasted back to the head of the plant. Ashes will be hauled by truck to the Prince George's County Sanitary Landfill at Brown's Station. (See Figure 2).

No operating by-pass capability has been provided for in the air pollution control system. This makes it impossible to operate the reactors without having the exhaust gases pass through the entire air pollution control equipment arrangement. An emergency relief has been supplied, in the form of a short stub duct with a bolted on blind flange, for the protection of the plant personnel and equipment under conditions of extreme emergency. This will prevent an in-plant catastrophe until normal shut-down procedures can be accomplished.

C. Incinerator Control

The incinerator reactors will be controlled by a combination of automatic and manual systems essentially located at a central control panel. This panel will contain instrumentation (such as oxygen analyzer, air flow indicator, etc.) to allow evaluating incinerator performance at any time.

D. Design Parameters (See References 4 & 5)

No. of reactors	3 (1 is standby)
No. of reactors normally on line	2
Reactor inside diameter	16'
Stack inside diameter	2'
Stack height	61'
No. of stacks	3 (1/reactor)
Hourly capacity/furnace (design)	1930 #/hr, dry solids (9650 #/hr sludge @ 80% moisture)
Exhaust gas residence time in reactor (@21,500 acfm)	20 sec., approx.
Exhaust gas flow rate through stack*	6324 acfm (per stack) (5197 scfm)
@ Temperature	115°F (90°F minimum)
@ Velocity	25.3 fps, actual (21.5 fps, corrected)
@ Moisture content	9.7%, by vol.

*Measured (avg) during EPA stack tests of a Piscataway reactor, Feb. 20 & 21, 1974

Auxiliary fuel (#2 oil), rate	60 gallons/HR/Furnace
Control Equipment	
Type (for particulates)	Venturi scrubber
Number	3 (1/reactor)
Pressure Drop	✓≤50" W.G.
Type (for moisture)	Cooler and demister
Number	3 (1/reactor)

SECTION II - INCINERATOR EMISSIONS

A. Emission Characteristics

The predicted levels of gaseous and particulate emissions from the incinerator are based on the following:

1. Design parameters listed in the previous section

2. Results of sewage sludge incineration studies performed by the Environmental Protection Agency (Ref. 1 & 2)

3. Results of EPA stack test of a Piscataway reactor, February 20 and 21, 1974

These predicted levels are listed in the Table below:

Pollutant	Anticipated Concentration in Stack @ STP, dry	Emissions Pounds/day (50%*) Theoretical	Measured **
Particulates	✓≤0.03 grains/SCFD	✓≤ 64	18.1
SO_2(a)		122	Not measured
NO_x		221.4	Not measured
CO	Essentially zero, see note (b)		Not measured
Organic Compounds (PCB's, DDT, etc)	Essentially zero, see note (c)		Not measured
Hg (d)		0.137	Not measured
Pb (e)		9	0.01
Living Organisms	Essentially none, see note (f)		Not measured

* Values listed are for average incinerator rate, (i.e., 2 reactors). If all 3 reactors should ever be operated simultaneously, emissions would increase by the 50% noted.

** Projected average emissions from EPA stack tests of a Piscataway reactor, Feb 20 & 21, 1974

(a) Due to combustion of #2 fuel oil. Per Reference 1, the sludge contribution to SO_2 is negligible because sludge sulfur content is primarily in the form of non-combustible sulfates.

(b) Good combustion control for oxygen is expected to provide for appreciably no CO.

(c) The reactor will destroy essentially all organic compounds (See Figure 3), although the temperature in the incinerator (1400°F) is somewhat below the 1600°F recommended in Reference 1.

(d) Weight of mercury in form of vapor or volatile compounds such as mercuric oxide is based on a maximum Hg concentration of 1.54 ppm in dry sludge. This concentration was obtained during sampling performed by the EPA, Annapolis Laboratory, on August 8 and 9, 1973. It is assumed that all the mercury in the sludge is emitted into the atmosphere (see Reference 1).

(e) Weight of lead as part of lead compounds is based on a maximum Pb concentration of 327 ppm in dry sludge. This concentration was obtained during sampling performed by EPA, Annapolis Laboratory on August 8 and 9, 1973. The degree to which lead emissions from a fluidized bed reactor will be controlled by the scrubber is not fully known (see attachments 1, 2 and 3 and Reference 1).

(f) The destruction of most pathogens is assured by the high temperatures in the incinerator (see Reference 3). Also, the high temperature of the combustion gases and their long residence in the reactor (1400°F at exit, 20 sec. residence) assure that neither the emissions into the ambient atmosphere, nor the residue ash which is to be disposed of in a sanitary landfill, offer a potential source of any magnitude for contamination from living organisms.

B. Emissions vs. Standards and Regulations

Federal

The current Federal emission standards for new (i.e., those whose construction was begun on or after June 11, 1973) sludge incinerators limit emissions to (see Reference 9):

1. Particulate matter shall not exceed 0.65 g/kg dry sludge input. This level of emissions is about equal to 0.031 gr/SCFD.

2. Opacity shall not equal or exceed 20%.

The Piscataway incinerator readily meets these standards. During stack tests by EPA on February 20 and 21, 1974, particulate emissions were well below standards. Opacity should have been proportionately low.

Several points bear noting here concerning the above stack test:

1. Although within its normal 50-60" W.G. range (see Reference 9), the scrubber was operated toward the high, i.e., more efficient collection end, at 57" W.G. during the test (see Attachment

2. Sludge combustion rate of 38,964 #/day during the test was somewhat below the 46,320 #/day design capacity of the reactor.

3. A large variability was exhibited by the measured stack gas particulate concentrations. The results from each of three tests are: 0.0168, 0.0046, and 0.0043 gr/SCFD. Although there is no explanation for this variation, all values are well below standards.

State Regulations

Present Maryland regulations in Area IV (Washington Metropolitan Area comprising Montgomery and Prince George's Counties) which apply to a new incinerator source are as follows:

Regulation	Subject	Requirement (Abbreviated)
10.03.39.02A	Visible emissions	No visible emissions other than water in uncombined form.
.03C	Incinerator particulate Emissions	0.03 gr/SCFD, @12% CO_2, W/O auxiliary fuel
.04A	Odors	No nuisance odors beyond property line
.04B	Sulfur in fuel	0.3%S orless in distillate oil

The predicted emissions from the Piscataway incinerator are expected to satisfy the above regulations, as shown below:

1. Visible emissions - No visible emissions in excess of 10% opacity were observed at the five incinerators tested by EPA (References 1 & 2). Since the Piscataway incinerator employs an even higher energy control device than used at the facilities visited by EPA, no visible emissions are anticipated.

2. Particulates - Emissions will not exceed 0.03 gr/SCFD.

3. Odors - No odors should emanate from this plant, based on the reactor combustion air duct design.

4. SO_x - The sulfur content of the auxiliary fuel (#2) used will be no more than 0.3% S, by weight.

5. The draft proposed standards (National Emissions Standards for Hazardous Air Pollutants) by EPA for Hg emissions from sewage sludge incinerators is 3200 grams/day (approx. 7#/day). (See Reference 8). A Hg standard for sewage sludge incinerators has been reviewed by the National Air Pollution Control Technical Committee and will be proposed in the near future.

6. At the present time, there is no standard for the emissions of lead from stationary sources.

C. Emission Calculations

1. Particulates

Each stack (i.e., reactor) emits 6324 ACFM. Correcting for temperature and moisture, this equals a flow rate of 5197 SCFMD.

$$(5197\ \text{Ft}^3/\text{min})\ (0.02\ \text{gr/Ft}^3)\ \frac{(60\ \text{Min/HR})}{7000\ \text{gr/\#}} = 1.34\ \text{\#/HR/ Reactor}$$

1.34 #/HR/Reactor x 2 Reactors x 24 HR/Day = 64 #/Day

It should be noted that an extremely high efficiency is required of the scrubber (approximately 99.9%) to maintain the outlet concentration below 0.03 gr/SCFD, given an inlet concentration of 11.1 gr/ACF, at 965°F, 32.8% moisture by weight (see Reference 4).

2. SO_2

Emission factor for distillate oil combustion (see Reference 6) is 142 lbs of SO_2 per 1000 gallons for each 1% of sulfur in oil.

$$142(0.3)\ \frac{60\ \text{GPH} \times 24}{1000} = 61\ \text{\#/Day/Reactor}$$

Total = 122 #/Day, Normal Operation

3. NO_x

Emissions are based upon those actually occurring at the Barstow, Calif. plant (see Reference 1) which also utilizes fluid bed reactors. Barstow experienced 126 ppm NO_x, average.

By using the relationship that ug $NO_x/m^3 = \frac{PPM}{5.32} \times 10^4$ (Federal Register, 4/30/71) and the 5197 SCFMD flow rate for each reactor, a value of 221.4 #/Day is obtained for 2 reactors.

$$\frac{(5197\ SCFMD)(126/5.32 \times 10^4 ug/m^3)(10^{-6} g/ug)(60\ min/hr)(24\ hr/day)}{(35.3\ SCF/m^3)(454\ g/\#)} = 110.7\ \#/Day/Reactor$$

4. Hg

EPA tests showed a maximum concentration of 1.54 ppm Hg in Piscataway sludge. Therefore,

(89,000 #/Day of sludge) (1.54 ppm Hg) = 0.137 #/Day

5. Pb

It appears that for a fluidized bed reactor, some of the lead in sludge may be inadequately controlled by a scrubber. A man balance (see Attachment 1) could not account for 31% of the lead entering the incinerator. Therefore, lead emissions may be as high as:

(89,000 #/Day of sludge) (327 ppm) (1-0.69) = 9 #/Day

The 327 ppm was the maximum concentration of Pb obtained during testing by EPA of sludge at the Piscataway Plant.

SECTION III - FINDINGS AND CONCLUSIONS

It is evident that the quantities of pollutants emitted by the incinerator are low and, except in the case of possibly Hg and Pb, are exceptionally well controlled. More data are needed to arrive at a closer estimate of Pb emissions. When compared to total emissions in the Washington, D. C. metropolitan area, these additional emissions are almost insignificant (see Reference 7). However, there still exists a slight potential for detrimental localized effects of the air pollutants from this source. Such effects are discussed in a following section.

An additional factor worthy of consideration is the ultimate size of the Piscataway AWT plant. If in the future the AWT plant is expanded to 95 mgd or more (as some plans foresee), the sludge incineration facilities are expanded to match increased sludge production, the potential for significant localized effects will increase some.

As for noise and aesthetic impacts, these will be present to a degree. It is anticipated that increased noise levels due to the expansion will be minimal, while increased visibility of new structures will detract somewhat from full aesthetic enjoyment of a predominantly residential and recreational area even though adequate new scrubs and trees have been planted at the plant site.

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9. 40 CFR Part 61, Standards of Performance for New Stationary Sources - March 8, 1974.

10. Personal communication with C. E. Willoughby, Chicago Bridge & Iron Co., (reactor contractor) on June 14, 1974.

9. LOCATION O[illegible]T CLEANIN[illegible] IN THE SYSTEM, DRAW OR SKETCH FLOW DIAGRAM SHOWING [illegible]
[illegible]M SOURCE TO EXHAUST POINT TO ATMOSPHERE.

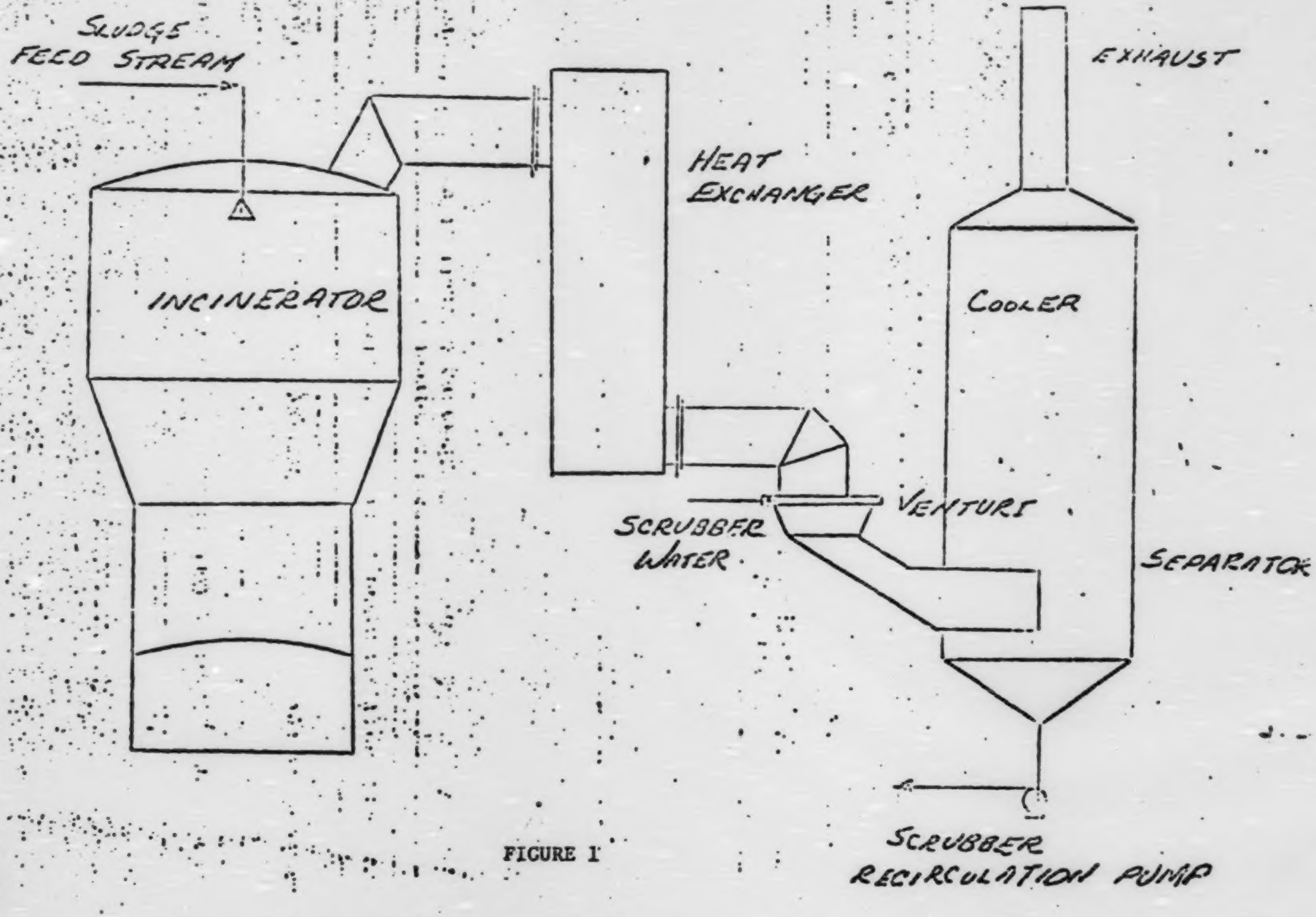


FIGURE 1

A-11

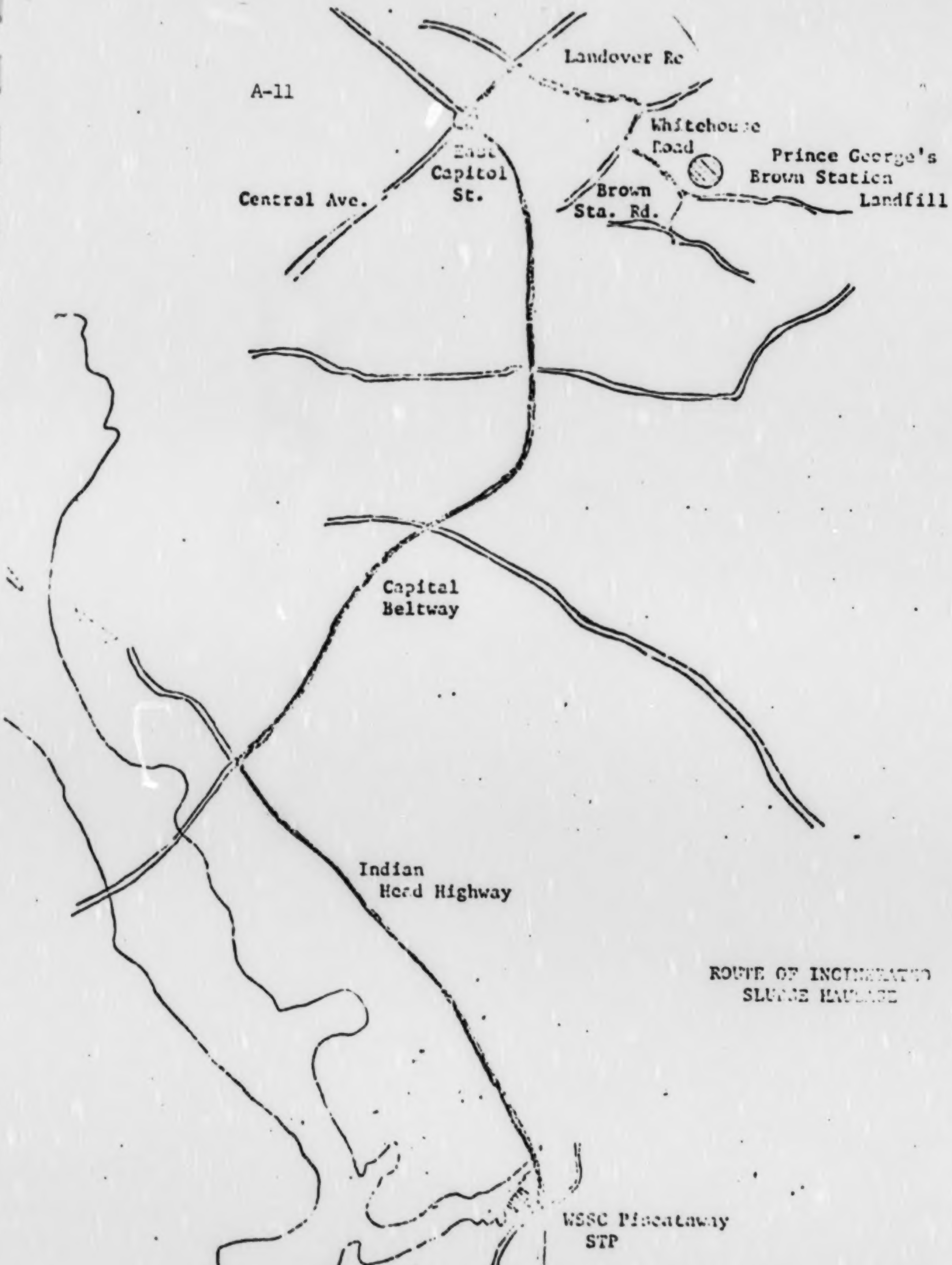

Landover Rd
Whitehouse Road
Prince George's Brown Station Landfill
East Capitol St.
Central Ave.
Brown Sta. Rd.
Capital Beltway
Indian Head Highway
ROUTE OF INCINERATED SLUDGE HAULAGE
WSSC Piscataway STP

Figure 2

INCINERATION EFFICIENCY STUDIES
OF A.R.CO IN-LINE DESIGN

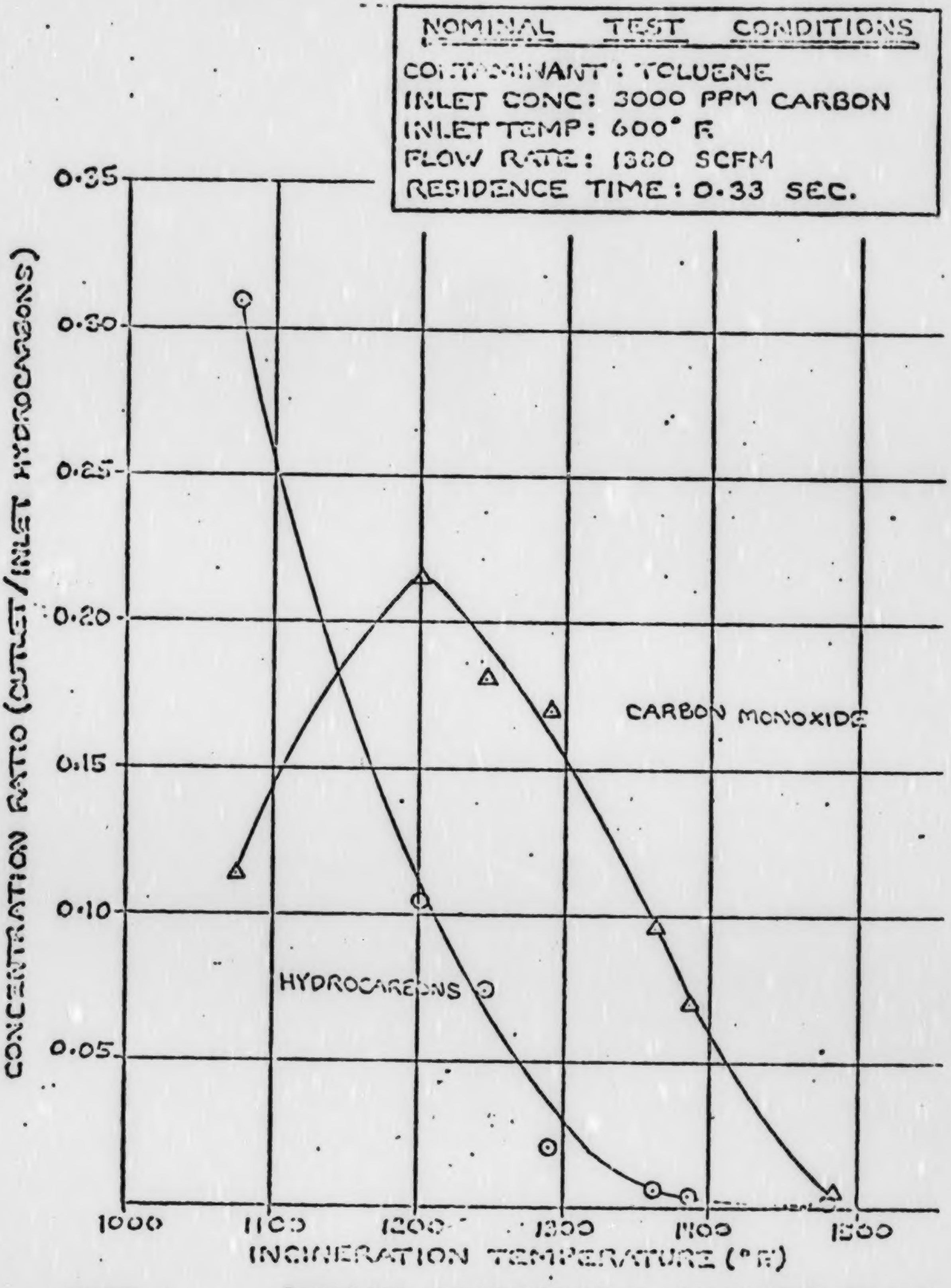


FIGURE 3 RESULTS OF CHEMICAL ANALYSIS MADE DURING INCINERATION EFFICIENCY STUDIES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ENVIRONMENTAL RESEARCH CENTER
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27711

SUBJECT: Analysis of Sludge Samples **DATE:** June 13, 1974

FROM: Dr. R. J. Thompson, Chief RJT
Analytical Chemistry Branch, QAEML

TO: Jack R. Farmer
Chief, Standards Development Branch, OAQPS

Our analytical instruments and data handling equipment used for trace element de[illegible] inoperable as one result of our most recent move. We will deliver the (hand) calculated results of the data for the elements you cited which were determined on our optical emission spectrometer by June 21, 1974.

The sludge samples (Sample Numbers S-74-001-215, S-74-001-223 and S-74-001-236) will be analyzed for the listed elements by contract and reported as ppm of trace element in the dry solid. The paper work for this contract will be wrapped up by June 21, 1975, so we should be able to give you data early next fiscal year.

cc: OD/QAEML
W. Loseke

EPA Form 1320-6 (Rev. 6-72)

Attachment #1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SUBJECT: Analysis of Piscataway Sewage Sludge Samples for Trace Elements

DATE: JUN 7 1974

FROM: Jack R. Farmer
Chief, Standards Development Branch/OAQPS

TO: Dr. Richard Thompson
Chief, Analytical Chemistry Branch/QAEML

EPA's Region III personnel have expressed considerable interest concerning the trace element emissions from the Piscataway sewage sludge incinerators that we have recently tested. It is my understanding from a telephone conversation between Tom Ward and Sharon Long on June 5, 1974, that the Method 5 particulate samples and blank solutions from the Piscataway test have already been processed for 24 trace elements (V, Sr, Sn, Te, Pb, Ti, Be, Zn, Sb, Al, As, Bi, Cd, Cr, Co, Cu, Fe, Tl, Hg, Mn, Mo, Ni, Ca, Sm) by an optical emission spectrographic method; but that the concentrations of the trace elements in the particulate matter have not yet been calculated. I also understand that there are sufficient quantities of sewage sludge samples from the Piscataway test to analyze for trace metals concentration.

I am therefore requesting that:

1) The concentration of the 24 trace elements listed above in the particulate matter be calculated and reported as ppm of trace element in the particulate matter, corrected for the trace element content of the solution blanks.

2) The following sludge samples (sample nos. S-74-001-215, S-74-001-223, S-74-001-236) be analyzed for the 24 trace elements listed above and reported as ppm of trace element in the dry solids.

Since the operation of the Piscataway incinerator is apparently being suspended subject to a more detailed evaluation of heavy metal emissions, I would appreciate your advising me by June 14 of the date by which you can complete this request.

cc: G. Jones, Region III
D. Goodwin
J. Farmer
J. Crowder
T. Ward
S. Roy
R. Ajax
T. Bibb

JUN 10 1974
[illegible] S.
[illegible] BRANCH

EPA Form 1320-6 (Rev. 6-72)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards

SUBJECT: Lead Stack Sampling Method Employed in EPA Test No. 74-SSI-3

DATE: June 14, 1974

FROM: William Grimley
Test Support Section, EMB

TO: Jack R. Farmer, Chief
Standards Development Branch, ESED

The following report has been prepared in response to your memorandum concerning lead emissions present in the combustion gases exiting the scrubber on the Piscataway Sewage Sludge Incinerator.

According to the Chemical Rubber Handbook (43rd edition, 1962) lead has a melting point of 327°C, a boiling point of 1620°C, and a vapor pressure of 10^{-5} mm Hg at 483°C (156°C above the melting point). Lead oxide has a melting point of 888°C. The vapor pressure of lead, which would represent the worst case, is analogous to a lead concentration of 3.2 micrograms/ft^3 at standard conditions. Since the filter in the Method 5 train is maintained at approximately 120°C (approximately 200°C below the melting point), measurable lead concentrations present at the filter should be in particulate form.

In regard to lead fume, a report published in the September 1944 issue of The Journal of Industrial Hygiene and Toxicology, by R. G. Keenan and L. T. Fairhall of the National Institute of Health describes a method for generating lead fume that was employed in a study to determine the lead fume collection efficiency of Greenburg-Smith impingers and other collection devices at various air flow-rates.

The lead fume was produced in a carrier gas of pure nitrogen by creating an arc between two carbon electrodes, one of which contained a lead core. After cooling, the lead fume/nitrogen mixture was subsequently diluted with clean air to form the sampling mixture. Through microscopic analysis, this fume was found to have an average lead particle size of 0.3 micron, with a standard deviation of 0.11. Analysis via x-ray diffraction demonstrated that the fume was metallic lead, as opposed to lead oxide. Oxidation of the lead fume had thus been prevented. Compared to lead oxide, the lead fume thus generated should represent the worst case from the standpoint of particulate collection--the lead fume has a lower melting point than lead oxide, and has a characteristic particle size in the range which is most difficult to collect with filtration equipment.

It was found that the lead in the mixture thus formed could be quantitatively recovered by sampling with a glass tube 38 mm in diameter by 30 cm long that had been packed with dry Pyrex glass wool.

Since the 1106 BH filter employed in EPA tests has a rated collection efficiency for 0.3 micron DOP (dioctyl phthalate) of 99.995%, it is therefore extremely unlikely that a large quantity of the lead emissions at the Piscataway incinerator could pass through the filter. Data presented in a "Survey of Manual Methods of Measurements of Asbestos, Beryllium, Lead, Cadmium, Selenium, and Mercury in Stationary Sources," by Stanford Research Institute (EPA Contract No. 68-02-0310, Project Officer: Rodney Midgett, Methods Standardization Branch) shows that ". . . 99% or more of the lead . . . collected was found in the probe, cyclone, and filter" (see attached copy of page 46). These results, which were obtained from tests performed with Method 5 equipment on a municipal incinerator in Dade County Florida, demonstrate that the train employed in the Piscataway tests has the capability to collect significant lead emissions at that type of source. Although the Piscataway data indicated a high ratio of lead in the back half catch as compared to the front half catch, very small quantities were measured. These could have resulted from contamination since the filter and impinger blank which were run and which were subtracted from the measured results, were not exposed to field cleanup procedures.

I have not been able to find any data to establish the collection efficiency for lead of any sampling device at the concentration levels represented by these values. The previously mentioned study dealt with concentrations from 10^3 to 10^4 as great. At those levels, it was determined that a single Greenburg-Smith impinger had a collection efficiency for metallic lead of approximately 20% at a sampling rate of 3/4 CFM, increasing to nearly 100% at 1 1/2 CFM.

Should you need further clarification, please let me hear from you.

Enclosure

The sampling train was divided into four components: (1) the probe and cyclone; (2) the filter; (3) the first impinger; and (4) the second and third impingers. Each component was analyzed for both lead and cadmium. The results of these analyses are presented in Table 10.

Table 10

MEASUREMENTS OF LEAD AND CADMIUM FIELD SAMPLES

	Sampling Train Component			
Sample	Probe and Cyclone (µg)	Filter (µg)	1st Impinger (µg)	2nd & 3rd Impingers (µg)
Pb #1	2145	1709	51	0
Pb #2	1525	2629	1	2
Pb #3	1405	3499	37	6
Pb #4	2545	1419	5	7
Cd #1	59	59	9	0
Cd #2	32	59	0	0
Cd #3	90	137	1	1
Cd #4	90	120	0	0

In all cases, except for in Cd #1, 99% or more of the lead or cadmium collected was found in the probe, cyclone, and filter. This indicates that the lead and cadmium were in a particulate form and that no significant volatile lead or cadmium compounds were present. If one were certain that the lead or cadmium in a source of interest is in particulate form, this analytical method could be used without the acid impingers. No correlations can be made between the amounts of lead and cadmium found in the four samples, since the conditions under which the incineration took place may have changed from sample to sample and the amount of lead and [illegible] UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SUBJECT: Piscataway Sewage Sludge Incinerator - Lead Emissions **DATE:** 12 APR 1974

FROM: B. J. Steigerwald, Director Campbell for
Office of Air Quality Planning and Standards

TO: Daniel J. Snyder, III
Regional Administrator, Region III

We collected samples from the exhaust gas from the Piscataway sewage sludge incinerator during February 20-21, 1974. The samples were analyzed by NERC-RTP personnel for lead content, and the results indicate that if all three incinerators were operating, the total lead emissions would be 4 grams per day. This is based on the average of three samples collected from one of the incinerators. The individual sample results are 1.423, 1.407, and 1.158 for an average of 1.330 grams per day. Based on all three incinerators operating, the emissions would be 4.269, 4.221, and 3.474 for an average of 3.990 grams per day.

Using information in the December 1973 draft of the Environmental Impact Statement on the Piscataway incinerator, we estimated that lead emissions of 4 grams per day would result in a maximum annual average ambient lead concentration of 0.0021 micrograms per cubic meter. This estimated concentration would occur 50 meters north of the incinerator.

I hope that this information will be helpful to you. If you have any questions or need additional information, please feel free to contact me.

cc: R. Strelow
✓ ~~G.~~ Jones, Region III
D. Bliss
D. Shearer
R. Proctor, USPHS
D. Goodwin
J. Farmer
D. Walters
D. Geller

cc: Blanco
Sutter
Carter
[illegible]

EPA Form 1320-6 (Rev. 6-72) 4/16/74

Attachment #2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SUBJECT: Lead Emissions from the Piscataway, Md., Sewage Sludge Incineration Plant of the Washington Suburban Sanitary Commission (WSSC)

DATE: April 10, 1974

FROM: T. E. Ward T. E. Ward
Regulations Preparation Section

TO: Jack R. Farmer
Chief, Standards Development Branch

Lead emissions from all three WSSC Piscataway, Md., sewage sludge incinerators combined are 4.0 grams/day (0.0088 lbs/day), based on preliminary data from tests run by EPA in mid-February 1974 on one of the three incinerators.

EPA lead emission tests and calculations were conducted in the following manner. Particulate samples were obtained using the EPA Method 5 sampling train setup. Both the front (including the filter) and back portions of the train were analyzed for lead content. Table 1 shows total lead content of the samples in micrograms. There is close agreement in the three values. Table 2 shows daily lead emissions in grams per day. The average emissions are 1.33 grams per day per incinerator. Total emissions from all three incinerators were calculated to be 4.0 grams per day as shown in Table 3. Figure 1 shows annual average lead concentrations close to the incinerator, which would result from an emission rate of 4.0 grams per day. The values shown on Figure 1 are the result of a reduction in direct proportion to the comparison of the emission values from the February 1974 test data to the emission values used in the draft Environmental Impact Statement (EIS) for the Piscataway plant.[1] The estimated location of the property line of the Piscataway Waste Water Treatment Plant is superimposed on the lead concentration isopleths in Figure 1. The annual average concentration at the nearest property line location to the incinerator is 0.00033 μg/m^3.

Certain parameters of incinerator operation during the EPA tests are shown in Table 4. Based on these data, it can be seen that the operation of the incinerator was normal, even though it was being operated in its acceptance operation phase by the incinerator contractor. The dry solids content data is not available at this time. The value of 20% dry solids is based on estimates by the Piscataway Waste Water Treatment Plant personnel and by the incinerator contractor personnel. The value of percent of maximum rated incinerator capacity in this data will vary proportionally as the actual dry solids percentage varies.

---

[1] Environmental Protection Agency Region III, December 1973, Draft Environmental Impact Statement Upgrading and Expansion of the WSSC Piscataway Waste Water Treatment Facility to 30 MGD AWI, Appendix B, pp. B-3, 11.

RECEIVED:
6/21/74
EPA, DAWP, RS
Technical Support Section

EPA Form 1320-6 (Rev. 6-72)

Attachment #3

The venturi scrubber and demister emission control system at the Piscataway plant should effect excellent control of particulate emissions. The emission data in this report are in the expected range considering the control device.

cc: R. Ajax
J. Crowder
D. Goodwin
S. Roy
R. Thompson
D. Walters

TABLE 1

TOTAL LEAD CONTENT

Sewage Sludge Incinerator Stack Emission Test Samples

Piscataway, Md.

Sample No. S-74-001-	Run No. and Date	Description	Total Lead in Sample µg
205 203 209 250	1 2-20-74	Front & back half, including filter	17.85
230 231 232 251	2 2-20-74	Front & back half, including filter	18.41
228 227 226 256	3 2-21-74	Front & back half, including filter	15.53

TABLE 2

Daily Emissions of Lead Per Incinerator, g/day

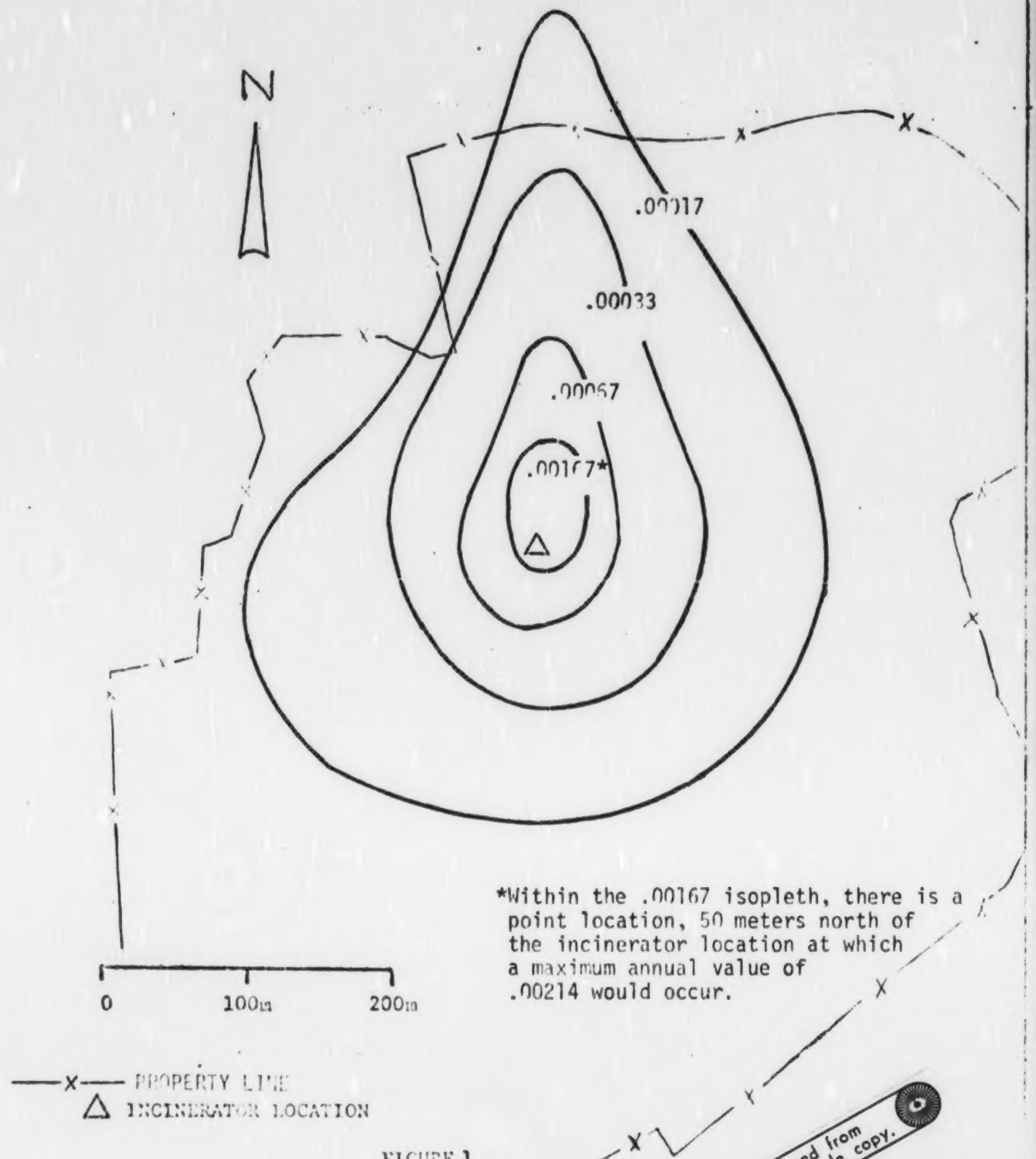
Piscataway Sewage Sludge Incineration Plant

Run No.	Total Emissions Per Incinerator	Calculations
	g/day	= $\frac{\mu g\text{(Total Sample)}}{ft^3\text{(Sample Volume)}} \times ft^3/min$ Total Stack Flow $\times$ 1440 min/day $\times 1 \times 10^{-6}$ g/µg
1	1.423	$\frac{17.85}{93.308} \times 5166.16 \times 0.00144$
2	1.407	$\frac{18.41}{97.601} \times 5178.51 \times 0.00144$
3	1.158	$\frac{15.51}{101.356} \times 5246.25 \times 0.00144$
AVG.	1.330	

TABLE 3

Total Emissions from Piscataway Sewage Sludge Incineration:

Total g/day	=	incinerators x daily emission rate, g/day per incinerator
3.99	=	3 x 1.33



*Within the .00167 isopleth, there is a point location, 50 meters north of the incinerator location at which a maximum annual value of .00214 would occur.

FIGURE 1
ANNUAL AVERAGE CONCENTRATIONS OF LEAD
DUE TO THE INCINERATOR ($\mu g/m^3$)

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TABLE 4

Certain Parameters of Incinerator Operation
During EPA Tests
Piscataway, Md., WSSC Sewage Sludge Incinerator

Description and Units	Values
Wet Sludge Burned, lbs/hour	8500
*Dry Sludge Burned, lbs/hour	1700
**Percent of Maximum Rated Incinerator Capacity	88
Incinerator Temperature, °F	1500
***Venturi Scrubber Pressure Drop, in. Hg	57
Stack Exhaust Gas Temperature, °F	115

*Based on assumed value of 20% dry solids contained in wet sludge.

**Ibid.

***Lance Buboltz of Chicago Bridge and Iron (CBI), Incinerator Contractor, stated that this actual operational value was the "normal operational pressure drop across the venturi in order to achieve the desired gas flow through the total incinerator control system," and that this value will be within CBI's recommended operating range.

Battelle
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201
Telephone (614) 299-3151
Telex 24-5454

July 30, 1974

Mr. Steve Torok
Environmental Impact Branch
U. S. Environmental Protection Agency
Region III
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Steve:

Attached is a description of our current plans for testing the Piscataway Sewage Sludge Incinerator. These plans are the final result of a review which took place in Piscataway on July 24 between WSSC, EPA, and BCL's staff. We believe these plans are complete, and represent one of the most thorough examinations of a sewage sludge incinerator process that has ever been proposed for sewage sludge incinerators.

If you have any questions, you may contact me on Extension 3645, Dr. James Flinn (Manager, Waste Control and Process Technology Section) on Extension 1615, or Dr. John M. Allen (Manager, Atmospheric Science Section) on Extension 2956.

Respectfully yours,

S. T. DiNovo
Associate Manager
Waste Control and Process
  Technology Section

STD/cmb

cc: Walter Klein
    Director of Environmental Management
    Washington Suburban Sanitary Commission
    Room 202, Research Division
    4407 Hamilton Avenue
    Hyattsville, Maryland 20781

Attachment #4

METHODOLOGY FOR PROPOSED TESTING OF PISCATAWAY INCINERATOR

This section details the flow rate determinations, the sample collection procedures, and the analyses to be performed on the Piscataway incinerator.

Essentially there are two inputs to the incinerator, the sludge and supplemental fuel (oil in this case) and two outlets, the wet ash from the scrubber and the particulate matter not captured by the scrubber which is discharged to the atmosphere.

Although it is expected that most of a given element or material will be accounted for by determining the flow rate and concentration of these three streams, there are likely secondary outlets for certain elements. These are:

(1) Absorption or reaction with the fluidized-bed sand
(2) Absorption or reaction with the firebrick
(3) Plating out of certain elements in the ash on the metal parts of the incinerator.

A discussion of sampling techniques and analysis procedures follows on each of these flows and secondary outlets.

Inlet Sludge

The flow rate of the sludge inlet is an important parameter to be measured. The thickened sludge coming from the vacuum drum filters is conveyed by a rubber conveyor belt into a hopper which feeds the Moyno pumps to the incinerator. The flow rate will be measured by three independent means.

(1) An automatic weighing device presently installed. It is understood that a certain amount of maintenance work is necessary at the present time on this device to ensure its proper operation.
(2) Observation of the speed of the Moyno pump. This pump is essentially a positive displacement screw

feeder. Data on the volume pumped/revolution will be obtained from the manufacturer. This will provide data from which the rate can be computed.

(3) Collection and weighing the sludge as it comes off the belt over a small time period. A bucket of about 5 gal capacity will be placed under the belt to collect the sludge. The frequency of collection will depend on the variability of the flow rate, about 5-10 measurements per hour should yield a reasonable average.

The rate data from all three methods will be compared and averaged if all are in reasonable agreement. If one method yields a rate which is much different than the two others, this method will not be considered in the averaging process.

The collection of sludge for subsequent characterization is important in that a representative sample be obtained over the time period of testing. The following procedure will be followed.

(a) Grab samples will be obtained at specific times during the test. The rate of sampling should be about every 10 minutes for a 2-hour or longer run.

(b) From the rate data obtained as described previously, the rate as a function of time will be obtained.

(c) A cumulative sample will then be made up from the individual grab samples by weighing out an amount proportional to the rate of sludge flow. For example, if the rate when sample #5 was taken were 20 lb/min, and the rate for sample #6 was 30 lb/min, then the weight of sample #6 in the composite would be 1-1/2 times the weight of sample #5.

The above procedure will ensure that the analysis will truly represent an average over the sampling period.

Fuel

Fuel oil is used as a supplemental fuel in the Piscataway incinerator. Compared with the ash levels of the sludge, the amount of ash in the oil is relatively small. In order to determine the significance of this source, the fuel flow will be measured, and estimates of the contribution will be done. Should the effect on the mass balance be significant, oil samples will be taken during the run and analyzed for the same constituents present in the inlet sludge.

Wet Scrubber Sludge

The slurry from the wet scrubber consists mainly of the ash from burning and some sand. After dewatering, this slurry is conveyed to a large dump container. As the flow rate of this sludge is expected to be much less (perhaps 10 percent) than the inelt flow, it is feasible to collect samples over a longer period of time. Thus, the method of measurement will be collection and weighing in a 5-gal container.

The collection and compositing of samples for analysis will be done in a similar fashion as in the case of the inlet sludge.

Particulate Matter in Stack

Incinerator stack gas particulate concentration will be determined by a modified Federal Register Method 5. The stack gases will be sampled at an isokinetic rate; the solids being collected on a heated absolute fiber glass filter. The gases which pass through the absolute filter will then pass through a series of bubblers containing appropriate solutions which will remove, specifically, constituents of lead and mercury and other heavy metals which may not have been collected on the absolute filter. To insure complete collection of all constituents from the gas sample, an additional 0.1 μm cellulose acetate absolute filter will follow the impinger train. The additional filter will be analyzed for trace metals concentration, specifically lead and mercury.

Other Determinations

In general, mass balance calculations that have been computed on fluidized-bed incinerators are somewhat inaccurate, that is, a very accuate accounting of material flows is usually impossible, despite the care used in flow measurement and sampling. In order to account for discrepancies in mass balances, an evaluation will be made of the possibility of interaction between incinerator sand, firebrick, and metal parts.

Sand. During the run, several samples of sand will be removed from the bed for analysis. In order to do this, a sampling system will be constructed which allows for sand removal during the run. The exact technique of doing this will be decided after detailed consideration of available sampling sites on the incinerator.

Firebrick. About six samples of firebrick will be suspended in the incinerator. Two will be removed before the run starts, midway through the test run, and at the end of the run. It is important that these brick samples be placed in the incinerator several days to one week prior to the test to allow time for steady-state to be reached. Again, the exact details of the brick removal will be worked out based on the design of the incinerator sample entry points.

Metal Parts. About six samples (coupons) of the same metal which is in contact with the hot flue gases will be placed in the incinerator. Removal of these coupons will be done in a similar fashion as the brick samples. Again, these pieces should be placed in the incinerator several days before the actual test is to be done.

Analysis

Analysis on the sludge inlet, wet scrubber sludge, particulate matter, sand, bricks, and metal coupons will be obtained for the following elements.

Antimony
Arsenic
Beryllium
Bismuth
Cadmium
Cadmium
Copper
Lead
Mercury
Nickel
Zinc

With the exception of arsenic, all analyses will be done using atomic absorption spectroscopy. Arsenic will be analyzed using an accurate photometric technique.

In addition to the above, analysis of a specially collected sample of the stack dust will be performed for the presence of asbestos. This is done by estimating the amount of asbestos present in a sample observed under the electron microscope.

APPENDIX B

DIFFUSION ANALYSIS OF LEAD AND MERCURY FROM THE PISCATAWAY SLUDGE INCINERATORS

APPENDIX B

DIFFUSION ANALYSIS OF LEAD AND MERCURY FROM THE PISCATAWAY SLUDGE INCINERATOR

William E. Belanger, P.E.

Peter L. Finkelstein, Ph.D.

November 1973

PISCATAWAY

A diffusion analysis of annual average concentration of lead and Mercury was made for the Piscataway Sludge Incinerator. The Climatological Dispersion Model developed by EPA's Meteorology Laboratory was used to perform the calculations. The results show that highest levels of lead and Mercury will be found very close to the plant, with much lower values found in the surrounding neighborhood. An analysis of the expected plume rise from the incinerator shows that the high local levels are caused by extremely limited plume rise, and that in many cases, the plume from the stacks may be expected to be carried to the ground in the wake of the incinerator building.

The Climatological Dispersion Model (CDM) determines long-term (seasonal or annual) quasi-stable pollutant concentrations at any groundlevel receptor using average emission rates from point and area sources and a joint frequency distribution of wind direction, wind speed, and stability.

This model differs from the Air Quality Display Model (AQDM) primarily in the way in which concentrations are determined from area sources, the use of Briggs' plume rise formula, and the use of an assumed power law increase in wind speed with height that depends on the stability.

For point sources, the average concentration Cp due to n point sources is given by

$$\overline{C}p = \frac{16}{2\pi} \sum_{n=1}^{n} \sum_{\ell=1}^{6} \sum_{m=1}^{6} \frac{\phi(k_n, \ell, m)\, G_n\, S(\rho_n, z; U_\ell, Pm)}{\rho_n} \quad (2)$$

where k_n = wind sector appropriate to the n^{th} point source

ℓ = index identifying the wind speed class

m = index identifying the class of the Pasquill stability category

$\phi(k,\ell,m)$ = joint frequency function

ρ_n = distance from the receptor to the n^{th} point source

$S(\rho,z;U_\ell,P_m)$ = dispersion function defined in Equations 2 and 3

z = height of receptor above ground level

U = representative wind speed

Pm = Pasquill stability category

If the receptor is presumed to be at ground level, that is, z = 0, then the functional form of $S(\rho, z;U_\ell, Pm)$ will be

$$S(\rho,0;U_\ell,Pm) = \frac{2}{\sqrt{2\pi}\,U_\ell\,\sigma_z(\rho)} \exp\left[-\frac{1}{2}\left(\frac{h}{\sigma_z(\rho)}\right)^2\right] X$$

$$\exp\left(\frac{-0.692\,\rho}{U\ \ T\ 1/2}\right) \qquad (2)$$

if $\sigma z(\rho) \leq 0.8$ L and

$$S(\rho,0{:}U_\ell,Pm) = \frac{1}{U_\ell\ \ L} \exp\left(\frac{-0.692\,\rho}{U_\ell T\ 1/2}\right) \qquad (3)$$

if $\sigma z(\rho)$ 0.8 L. New terms in Equations 2 and 3 are defined as follows:

$\sigma z(\rho)$ = vertical dispersion function, i.e., the standard deviation of the pollution concentration in the vertical plane

h = effective stack height of source distribution, i.e., the average height of area source emissions in the k^{th} wind direction sector at radial distance ρ from the receptor.

L = the afternoon mixing height

T 1/2 = assumed half life of pollutant, hours

The possibility of pollutant removal by physical or chemical processes is included in the program by the decay expression

$$\exp\left(\frac{-0.692\,\rho}{U_l\,T\,1/2}\right).$$

The total concentration for the averaging period is the sum of concentrations of the sources for that averaging period.

The plume rise was calculated using the methods described by Briggs (1970). The increase of wind speed with height assumes the results of DeMarrais (1959).

Input data used were as follows:

Emissions	Hg - .025 T/y Pb - 1.65* T/y (constant 24 hrs./day throughout the year)
Stack Height	18.6 m
Stack Diameter	0.6 m
Exit Temperature	305°K
Stability Wind Rose	Washington National Airport, 1965-1969 average
Mixing heights	morning average 300m afternoon average 1400m
Temperature	20°C

A complete report on the model, "Users Guide for the Climatological Dispersion Model", (EPA-R-4-73-024) is available from the Technical Publications Branch, EPA, Research Triangle Park, N.C. 27711.

*Emissions estimates range from .01 to 9 pounds per day: For the purposes of calculations in this report the 9 lbs/day figure is assumed. If the actual amounts measured in future tests proves to be smaller, a simple proportional reduction in ambient consentrations should be performed.

RESULTS

The results of the model are given in Figures 1-4. Figure 1 shows the predicted annual average concentration isopleths for Mercury (Hg). Figure 2 shows the area immediately around the incinerator in more detail. The maximum concentration calculated was .034 ub/m^3 at a point 50 meters north of the plant. Outside a circle kl Km in radius, the maximum value falls to .001 ug/m^3 . The values given here are annual averages and represent average data over a five-year period. Any one 30-day period within this time could possibly experience ambient levels considerably (perhaps up to a factor of 5) higher or lower than shown here. Concentrations would vary depending on the predominant synoptic weather patterns during that time period, and their deviation from the norm.

Figures 3 and 4 shows the predicted annual average concentrations for lead (Pb). Emissions of 1.65 T/y are assumed. As before, Figure 4 gives the details of the ambient concentration close to the incinerator. The maximum annual average concentration predicted by the model is 2.2 ub/m^3 . Concentrations fall to less than .7 ug/m3 outside a circle with a 0.15 km radius. Again, it must be noted that this is an average concentration calculated using 5 years of meteorological data. Any one year or season might vary considerably from this value.

In evaluating the results of the diffusion model, one should note that the concentrations given here are only from the incinerator. Any existing ambient levels of mercury or lead from other sources, natural or man-made, must be added to the values given here to find the total amounts of these metals in the air.

We have no measurements of ambient levels of Mercury, and no measurements of the ambient levels of lead near the incinerator location. The following data from the NASN System may be helpful in arriving at some idea of the probable lead background levels.

AMBIENT AIR QUALITY LEVELS FOR LEAD

		1968 (ug/m^3)	1969 (ug/m^3)
Urban	Washington, D.C.	0.7	1.25
	Baltimore	1.45	1.67
Rural	Calvern Co., Md.	.15	.2

In its location, the Piscataway Incinerator probably has ambient lead levels some place between the rural levels of Calvert County and the downtown stations in Washington, D.C. and Baltimore. This level would be added to the values given in Figures 3 and 4 to arrive at the predicted lead concentration.

It was noted that plume rise from the plant is minimal because of the low exit velocity and temperature of the effluent gas. The top of the stacks are also at the same height as the roof peak of the incinerator building. With these conditions, one could expect that the plume will frequently be trapped in an eddy on the downwind side of the building. This will result in high levels of pollutants for short time periods in the immediate vicinity of the building. It is difficult to assess what effect this will have on the long term averages.

Briggs, in an unpublished study has postulated that a plume will be drawn to the ground when the combined stack height and momentum phase of the plume rise is less than one and a half times the building height. Or down wash will occur when

$$h(l) \leq 1.5\, h_{Bldg}$$

where

$$h(l) = H(s) + 2d \left(\frac{V}{U} - 1.5\right)$$

h(s) = height of the stack = 18.6(m)
d = stack diameter = 1.2m
V = stack gas velocity = 16.4m/s
U = wind speed

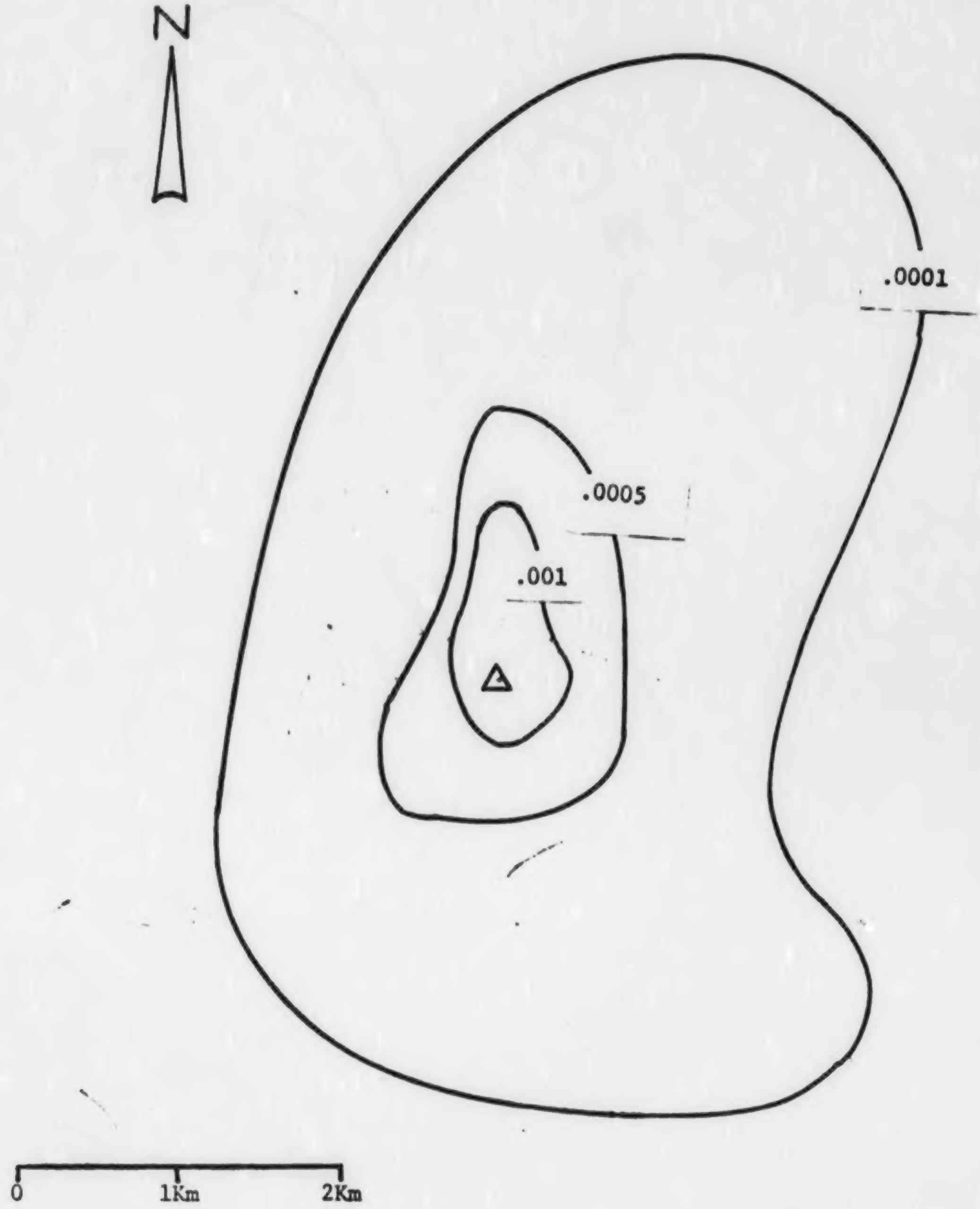
Solving for the wind speed (U) with h(l) equal to 1.5 h = 27.9m; one finds that down wash will occur whenever the wind speed is greater than 1.8 m/s.

The effect of plume downwash will not be great at moderate distances, however, because the plume rise is so very limited in any case. In the same manner the effects of topography will be minimal since even in level terain the plume is never more than a few tens-of meters from the ground.

BIBLIOGRAPHY

1. Briggs, G.A. (1970), Some Recent Analyses of Plume Rise Observations: ATDL Contribution No. 38; Atmospheric Turbulence and Diffusion Laboratory, Oak Ridge, Tennessee.

2. DeMarrais, G.A. (1959) "Wind Speed Profiles at Brookhaven National Laboratory" J. Appl. Meteorol., 16, 181-189.



△ INCINERATOR LOCATION

FIGURE 1
ANNUAL AVERAGE CONCENTRATIONS OF MERCURY (ug/m^3)

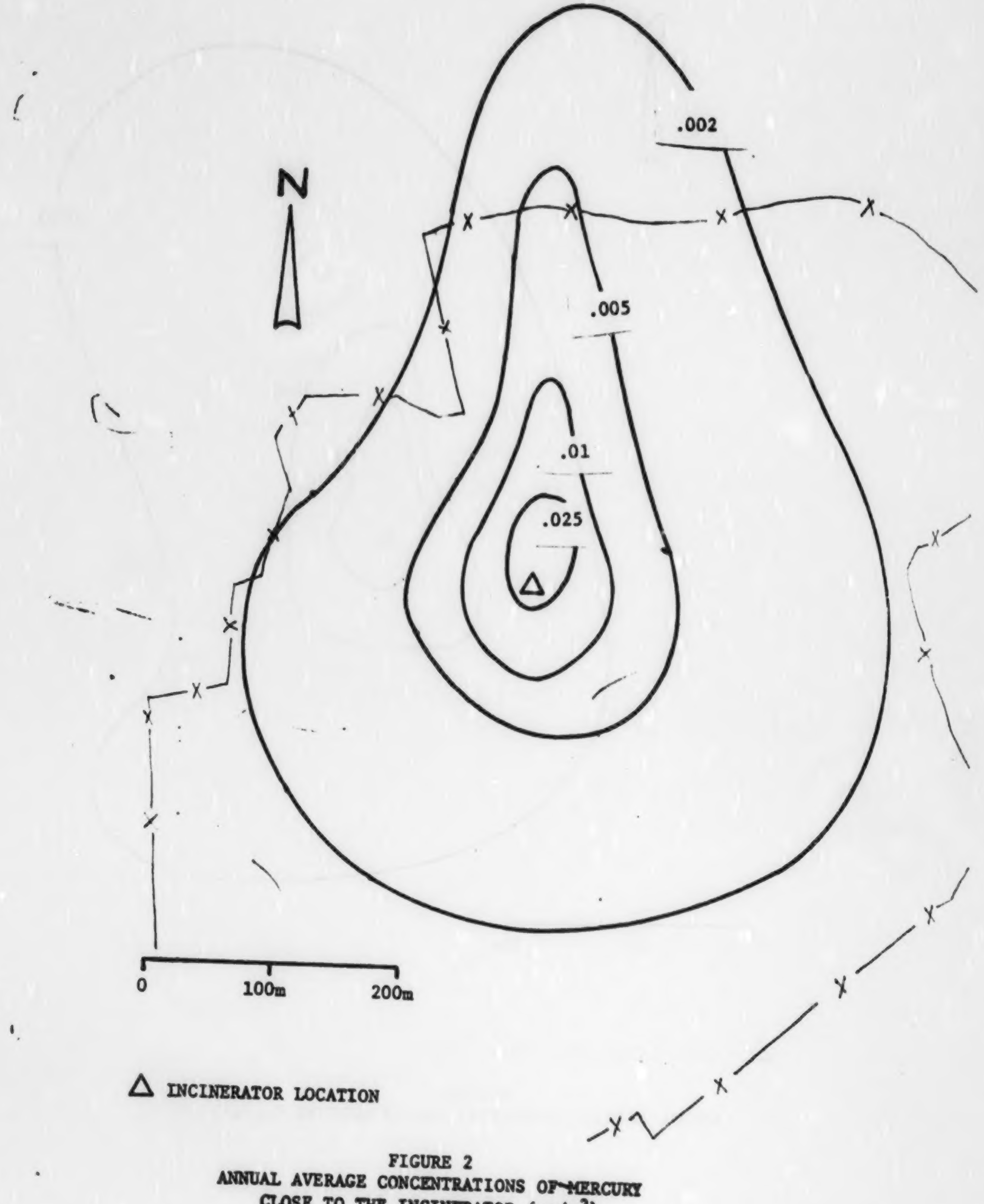


FIGURE 2
ANNUAL AVERAGE CONCENTRATIONS OF MERCURY
CLOSE TO THE INCINERATOR (ug/m^3)

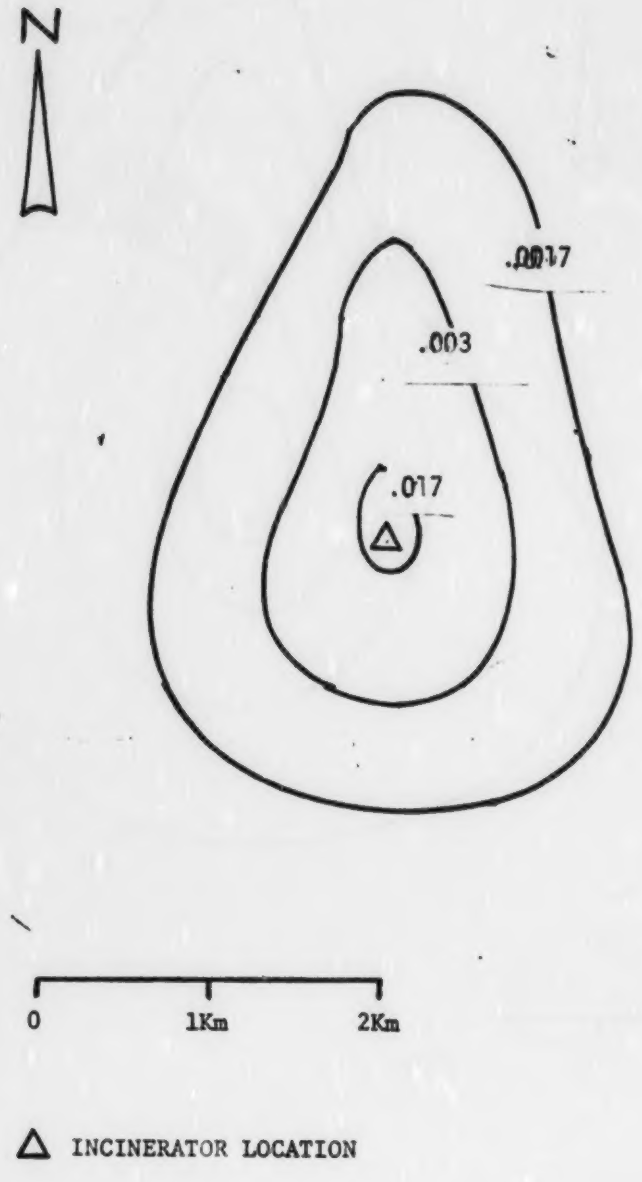


FIGURE 3
ANNUAL AVERAGE CONCENTRATIONS OF LEAD (ug/m^3)

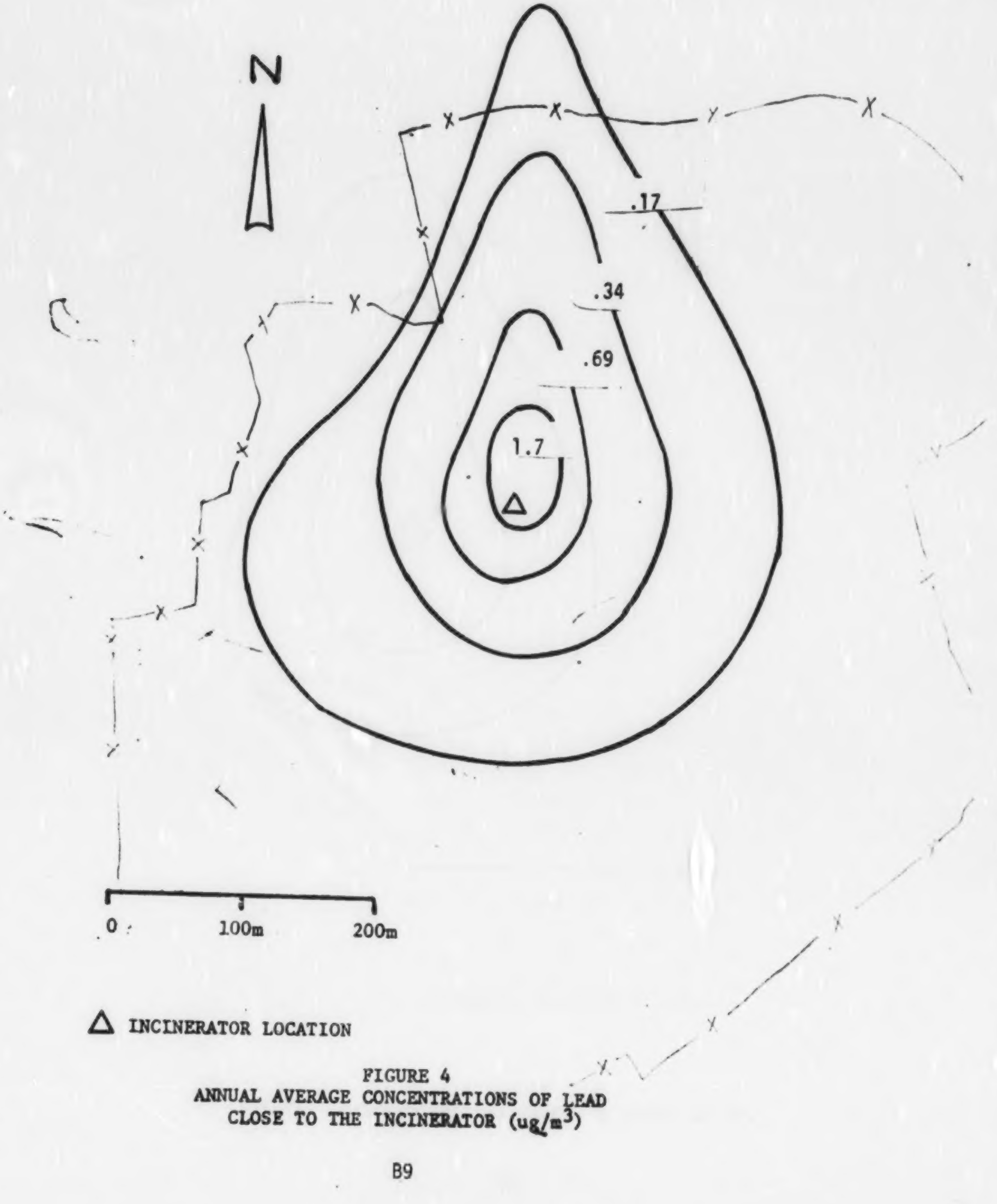


FIGURE 4
ANNUAL AVERAGE CONCENTRATIONS OF LEAD
CLOSE TO THE INCINERATOR (ug/m^3)

APPENDIX C

TOXOLOGICAL APPRAISAL OF MODEL RESULTS
(LEAD, MERCURY)

APPENDIX C

TOXOLOGICAL APPRAISAL OF MODEL RESULTS

W. E. Belanger, P.E.

TOXOLOGICAL APPRAISAL OF MODEL RESULTS
LEAD

Until recently, ambient atmospheric lead levels below 2 ug/m^3 over periods 3 months or greater were considered safe. Recent evidence has caused EPA to revise its position in this matter because of new evidence presented in response to proposed regulations on automotive fuels. EPA's current position is that any exposure should be minimized. This position centers primarily on unknowns associated with the development of the human fetus and early childhood. It is generally conceded, though, that blood-lead levels below 40 micrograms/100 ml are acceptable, while the 40-60 range is questionable due to minor metabolic changes.

Lead exposure is associated with all sources of lead intake, not merely inhaled lead, and much of the body burden of lead in young children is thought to be from ingestion of dirt containing lead, rather than from respiratory sources. It is stated that continued ingestion of only a fraction of a teaspoon per day of dirt and dust presently found in urban areas would easily exceed the permissible intake of lead for children. It must be noted, though, that a certain small intake of lead over a long period can be tolerated because it is balanced by urinary excretion.

It is therefore prudent to conclude that high levels of atmospheric lead need not necessarily occur in a residential area in order to be harmful. It is reasonable to assume that elevated atmospheric lead levels would eventually lead to elevated ground-dust lead levels. Should this ground dust blow into a populated area, or should children regularly play in this ground dust, the result may be exposure to an excessive amount of lead without excessive atmospheric exposure. For this reason, any area of high atmospheric lead should be prevented. It may be concluded that simple measurement of atmospheric lead is not sufficient to assess the impact of the incinerator. Lead-in-soil determinations must be made prior to and during operation in order to make this judgement. It is not expected that simple respiratory exposure to lead from this source is cause for concern.

The following discussion responds to the toxicological aspects of the April 7, 1974 paper prepared by the Air Pollution Committee, Prince George's Environment Coalition:

The lead exposure values used by the Committee to arrive at health effects may be considerable in error on the high side. What follows, demonstrates that even if the Committee's calculations are correct, the health danger to area residents would be minimal.

Two references cited for data are private communications which cannot be verified, however the numbers quoted seem conservative, and will not be challenged. The problem appears to be centered around point #10 titled "Biological Half-Life" which the Committee states is infinite, based on a single statement taken out of context from Sax. Had the Committee read on to the next page of the same reference, it would have found that excretion of lead in the urine is substantial, and therefore the biological half-life cannot be infinite. On the whole, this demonstrates a basic lack of understanding of the mechanism involved in body lead accumulation, and the issue should not be allowed to resent with the simplistic assumptions in the Committee's work.

Lead is defined in most references as a cumulative poison. This does not mean that it is not eliminated from the body, but only that continued exposure to high levels can lead to a gradual buildup in the body. This only implies that the body's input of lead exceeded its output over a long period of time. Blood lead levels above 0.05 mg/100 ml are defined as "elevated", as are lead-in-urine concentrations above 0.1 mg/liter. These levels, or levels even higher, do not necessarily imply lead poisoning, they simply are defined as elevated blood and urine lead levels. The basis for these numbers is that no case of clinical lead poisoning has been found below these levels, and the usefulness of these values is only in confirmation of lead poisoning when clinical symptoms are present. Generally, if blood and urine lead values are below these levels, lead poisoning can be ruled out. Therefore, the statement in point #15 that lead poisoning would be caused in 1 1/2 months is a mis-use of these guideline lead values. I must agree, though, that it is a useful goal to keep body lead levels below these values, as this will guard against lead poisoning.

The presence of lead in urine is ample evidence that it is not retained indefinitely by the body. It may then be useful to speculate what would happen if a 25KG child's blood-lead were at the top of the normal range (.05 mg/100ml), and he were continuously exposed to ambient levels as calculated by the Committee. The child in question having a blood volume of 1750 ml would have a daily urinary output of about 600 ml per day. Assuming his urinary lead would also be at the top of the normal range, he would excrete 0.6 liter x 0.1 mg/liter = .06 mg/day of lead (60 micrograms). The child's body lead should therefore decrease unless his daily lead retention were to exceed 60 micrograms per day. Using the number in the Committee's point #13 for "adjusted daily lead intake" (.016 mg/ml-day) and multiplying by 1750 ml blood volume, one finds a calculated total lead intake of 28 micrograms per day for the child in question. Therefore, even if this child's blood lead were at the top of the normal range, unless his lead retention from other sources were greater than 32 micrograms per day, his body lead levels would decrease. It is highly unlikely that a child's lead retention from other sources would exceed this value unless he were grossly exposed through paint-chewing or some other major source of lead poisoning.

A realistic estimate of daily lead retention of urban dwellers is about 50 micrograms for adults, or about 25 micrograms for a child this size. About two-fifths of this is received through the respiratory system. (Environmental Lead and Public Health, EPA, March 1971). Since urban dwellers are not generally recognized to be suffering from clinical lead poisoning, nor are urban blood levels "elevated" except where high (usually dietary (pica) or occupational) exposure is involved, it is reasonable to assume that this level of average daily lead retention can be tolerated well by the body. Since this urban lead retention is nearly 50% of what would cause elevated lead levels, it is obviously prudent to increase the safety margin as practical, but that is not the issue here. The Committee calculated exposure values orders of magnitude in excess of what actually will be the case, so even the most prudent among us would agree that the incinerator would not cause excessive lead exposure, even in its immediate vicinity.

These comments, and those concerning meteorology in the Response Section, should add important perspective to the issue of potential health effects of the Piscataway incinerator. The testing programs being performed by Battelle-Columbus Laboratories and the University of Maryland will be reported in a Supplement to this EIS.

MERCURY

"To determine the ambient air level of mercury that does not impair health, the airborne burden must be considered together with the water- and food-borne burdens. An expert group concluded, based on its analysis of several episodes of mercury poisoning in Japan, that 4 micrograms of methylmercury per kilogram of bodyweight per day would result in the intoxication of a sensitive adult; application of a safety factor of 10 yielded an acceptable exposure of about 30 micrograms per day for a 70-kilogram man, and this level is also believed to provide satisfactory protection against genetic lesions, and poisoning of the fetus and of children (4).

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It should be noted that methylmercury is considered to be by far the most hazardous mercury compound, particularly via the ingestion of fish in which it has been concentrated through the food chain (3,5). The Environmental Protection Agency, in view of the present limited knowledge as to the effects of inhaled mercury in the general population, and in order to best assure the requisite "ample margin of safety to protect the public health", has concluded that it is prudent to consider exposures to methylmercury (diet) and mercury vapor (air) to be equivalent and additive. It has been estimated that from average diets, over a considerable period, mercury intakes of 10 micrograms per day may be expected (6), so that, in order to restrict total intake to 30 micrograms per day, the average mercury intake from air would have to be limited to 20 micrograms per day. Assuming inhalation of 20 cubic meters of air per day, the air could contain an average daily concentration of no more than 1 microgram of mercury per cubic meter."

(From Federal Register, Volume 38, Number 66.)

REFERENCES

LEAD

1. *Airborne Lead in Perspective*; National Academy of Sciences; Washington, D.C.; 1972

2. "EPA's Position on the Health Effects of Airborne Lead"; U.S. Environmental Protection Agency; Nov. 29, 1972

3. *Federal Register*; Volume 38, Number 6, Part III; January 10, 1973; "Regulation of Fuels and Fuel Additives:

MERCURY

1. *Federal Register*; Volume 38, Number 66, Part II; April 6, 1973; "National Emission Standards for Hazardous Air Pollutants"

2. "Preliminary Air Pollution Survey of Mercury and Its Compounds"; U.S. Dept. of Health, Education, and Welfare; October, 1969

APPENDIX D

BIOLOGY

Table D1

PISCATAWAY EFFLUENT LINE
RIGHT OF WAY

Type of Trees Over 3" Diameter

Common Name	Species
Sweetgum	*Liquidambar styraciflua*
Persimmon	*Diospyros virginiana*
Oak	*Quercus* species: *Q. palustris* prob. *Q. velutina* *Q. phellos* uncertain species *Quercus* (all in red oak group)
Black Locust	*Robinia pseudoacacia*
Red Maple	*Acer rubrum*
Black Cherry	*Prunus serotina*
American Elm	*Ulmus americana*
Eastern Redcedar	*Juniperus virginiana*
Ash	*Fraxinus* sp., probably *F. pennsylvania*
Black Tupelo	*Nyssa sylvatica*
Apple	*Malus pumila*
Black Walnut	*Juglans nigra*
Flowering Dogwood	*Cornus florida*
Tuliptree	*Liriodendron tulipifera*
Beech	*Fagus grandifolia*
Shortleaf Pine	*Pinus echinata*
Sycamore	*Platanus occidentalis*

BIRDS THAT MAY WINTER IN PISCATAWAY AREA

TABLE D2

Common Name	Genus and Species	Habitat
Horned Grebe	Podiceps auritus	Tidal Estuaries
Great Blue Heron	Ardea herodias	Tidal Estuaries and Rivers
Black-Crowned Night Heron	Nycticorax nycticorax	Marshes
Whistling Swan	Olor columbianus	Tidal Estuaries
Canada Goose	Branta canadensis	Tidal Estuaries
Mallard	Anas platyrhynchos	Tidal Estuaries
Black Duck	Anas rubripes	Tidal Estuaries and Marshes
Gadwall	Anas strepera	Tidal Estuaries and Marshes
Pintail	Anas acuta	Tidal Estuaries
Green-Winged Teal	Anas carolinensis	Tidal Marshes and Rivers
Blue-Winged Teal	Anas discors	Marshes
European Widgeon	Mareca penelope	Tidal Estuaries and Marshes
American Widgeon	Mareca americana	Tidal Estuaries and Marshes
Shoveler	Spatula clypeata	Marshes
Wood Duck	Aix sponsa	Rivers
Redhead	Aythya americana	Tidal Estuaries
Ring-Necked Duck	Aythya collaris	Tidal Estuaries
Canvas back	Aythya valisineria	Tidal Estuaries
Greater Scaup	Aythya marila	Tidal Estuaries
Lesser Scaup	Aythya affinis	Tidal Estuaries
Common Goldeneye	Bucephala clangula	Tidal Estuaries
Buffleheads	Bucephala albeola	Tidal Estuaries
Ruddy Duck	Oxyura jamaicensis	Tidal Estuaries
Common Merganser	Mergus merganser	Rivers
Turkey Vulture	Cathartes aura	Pastures and Fallow Fields
Black Vulture	Coragyps atratus	Pastures and Fallow Fields
Cooper's Hawk	Accipter cooperii	Scrub and Deciduous Woods 2
Red-Tailed Hawk	Buteo jamaicensis	Scrub and Fallow Fields
Red-Shouldered Hawk	Buteo lineatus	Scrub and Bottomland Forest
Rough-Legged Hawk	Buteo lagopus	Tidal Marshes and Fallow Fields
Bald Eagle	Haliaeetus leucocephalus	Tidal Estuaries
Marsh Hawk	Circus cyaneus	Marshes and Fallow Fields
Pigeon Hawk	Falco columbarius	Marshes

TABLE D2 (cont'd)

Sparrow Hawk	Falco sparverius	Fallow Fields and Pastures
Bobwhite	Colinus virginianus	Scrub and Fallow Fields
King Rail	Rallus elegans	Marshes
Clapper Rail	Rallus longirostris	Marshes
Virginia Rail	Rallus limicola	Marshes
American Coot	Fulica americana	Tidal Estuaries
Killdeer	Charadrius vociferus	Pastures
American Woodcock	Philohela minor	Scrub and Fallow Fields
Common Snipe	Capella galliago	Marshes and Pastures
Greater Yellowlegs	Totanus melanoleucus	Marshes
Lesser Yellowlegs	Totanus flavipes	Marshes
Least Sandpiper	Erolia minutilla	Marshes
Great Black-Backed Gull	Larus marinus	Tidal Estuaries
Herring Gull	Larus argentatus	Tidal Estuaries
Ring-Billed Gull	Larus delawarensis	Tidal Estuaries
Bonaparte's Gull	Larus philadelphia	Tidal Estuaries
Mourning Dove	Zenaidura macroura	Fields
Screech Owl	Otus asio	Deciduous Woods
Great Horned Owl	Bubo virginianus	Woods
Barred Owl	Strix varia	Bottomland Forest
Short Eared Owl	Asio flammeus	Marshes
Saw-Whet Owl	Aegolius acadicus	Pine Woods and Scrub
Belted Kingfisher	Megaceryle alcyon	Tidal Marshes and Rivers
Yellow-Shafted Flicker	Colaptes auratus	Scrub and Suburbs
Pileated Woodpecker	Dryocopus pileatus	Woods
Red-Bellied Woodpecker	Centurus carolinus	Woods
Red-Headed Woodpecker	Melanerpes erythrocephalus	Woods
Yellow-Bellied Sapsucker	Sphyrapicus varius	Bottomland Woods
Hairy Woodpecker	Dendrocopos villosus	Woods
Downy Woodpecker	Dendrocopos pubescens	Woods
Eastern Phoebe	Sayornis phoebe	Scrub
Horned Lark	Eremophila alpestris	Plowed Fields
Blue Jay	Cyanocitta cristata	Woods
Common Crow	Corvus brachyrhynchos	Fields
Fish Crow	Corvus ossifragus	Tidal Estuaries
Carolina Chickadee	Parus carolinensis	Woods
Tufted Titmouse	Parus bicolor	Woods
White-Breasted Nuthatch	Sitta carolinensis	Deciduous Woods

TABLE D2 (cont'd)

Red-Breasted Nuthatch	Sitta canadensis	Pine and Hemlock
Brown-Headed Nuthatch	Sitta pusilla	Pine Woods
Brown Creeper	Certhia familiarsis	Woods
Winter Wren	Troglodytes troglodytes	Woods
Bewick's Wren	Thryomanes bewickii	Scrub
Carolina Wren	Thryothorus ludovicianus	Scrub
Long-Billed Marsh Wren	Telmatodytes palustris	Marsh
Mockingbird	Mimus polyglottos	Scrub and Suburbs
Catbird	Dumetella carolinensis	Scrub and Suburbs
Brown Thrasher	Toxostoma rufum	Scrub and Suburbs
Robin	Turdus migratorius	Pastures and Suburbs
Hermit Thrush	Hylocichla guttata	Woods
Eastern Bluebird	Sialia sialis	Scrub and Fields
Golden-Crowned Kinglet	Regulus satrapa	Scrub
Ruby-Crowned Kinglet	Regulus calendula	Bottomland Forests
Water Pipit	Anthus spinoletta	Plowed Fields and Marshes
Cedar Waxwing	Bombycilla cedrorum	Scrub and Suburbs
Loggerhead Shrike	Lanius ludovicianus	Scrub
Starling	Sturnus vulgaris	Scrub and Fields
Myrtle Warbler	Dendroica coronata	Scrub and Bottomland Forest
Yellowthroat	Geothlypis trichas	Marsh and Bog
House Sparrow	Passer domesticus	Fields and Suburbs
Eastern Meadowlark	Sturnella magna	Hayfields and Pastures
Red-Winged Blackbird	Agelaius phoeniceus	Woods
Common Grackle	Quiscalus quiscula	Fields
Brown-Headed Cowbird	Molothrus ater	Fields
Cardinal	Richmondena cardinalis	Scrub and Suburbs
Evening Grosbeak	Hesperiphona vespertina	Scrub and Suburbs
Purple Finch	Carpodacus purpureus	Scrub and Suburbs
House Finch	Carpodacus mexicanus	Suburbs
Pine Siskin	Spinus pinus	Scrub
American Goldfinch	Spinus tristis	Scrub and Suburbs
Rufous-Sided Towhee	Pipilo erythrophthalmus	Scrub and Suburbs
Savannah Sparrow	Passerculus sandwichensis	Fields
Sharp-Tailed Sparrow	Ammospiza caudacuta	Marshes
Vesper Sparrow	Pooecetes gramineus	Fields
Slate-Coloured Junco	Junco hyemalis	Scrub and Fallow Fields

TABLE D2 (Cont'd)

Common Name	Genus and Species	Habitat
Tree Sparrow	Spizella arborea	Scrub and Fallow Fields
Field Sparrow	Spizella pusilla	Scrub and Fallow Fields
White-Crowned Sparrow	Zonotrichia leucophrys	Scrub and Fallow Fields
White-Throated Sparrow	Zonotrichia albicollis	Woods
Fox Sparrow	Passerella iliaca	Woods
Swamp Sparrow	Melospiza georgiana	Scrub and Marsh
Song Sparrow	Melospiza melodia	Scrub and Fallow Fields

Footnotes:

[1] The birds are listed according to the accepted ornithological practice (family, genus, species); this sequence adheres to the genetic evolution of the families.

[2] Scrub includes secondary-growth trees, underbrush and/or hedgerows.

BIRDS THAT MAY BREED IN PISCATAWAY AREA

TABLE D3

Common Name	Genus and Species	Habitat
Great Blue Heron	Ardea herodias	Tidal Estuaries and Rivers
Green Heron	Butorides virescens	Tidal Estuaries and Rivers
Little Blue Heron	Florida caerulea	Marshes
Black-Crowned Night Heron	Nycticorax nycticorax	Marshes
Yellow-Crowned Night Heron	Nyctanassa violacea	Marshes
Least Bittern	Ixobrychus exilis	Marshes
American Bittern	Botaurus lentiginosus	Marshes
Mallard	Anas platyrhynchos	Tidal Estuaries
Black Duck	Anas rubripes	Tidal Estuaries and Marshes
Blue-Winged Teal	Anas discors	Marshes
Wood Duck	Aix sponsa	Rivers
Hooded Merganser	Lophodytes cucullatus	Rivers
Turkey Vulture	Cathartes aura	Pastures and Fallow Fields
Black Vulture	Coragyps atratus	Pastures and Fallow Fields[2]
Cooper's Hawk	Accipter cooperii	Scrub and Decidious Woods
Red-Tailed Hawk	Buteo jamaicensis	Scrub and Fallow Fields
Red-Shouldered Hawk	Buteo lineatus	Scrub and Bottomland Forest
Broad-Winged Hawk	Buteo platypterus	Deciduous Woods
Bald Eagle	Haliaeetus leucocephalus	Tidal Estuaries
Marsh Hawk	Circus cyaneus	Marshes and Fallow Fields
Osprey	Pandion haliaetus	Tidal Estuaries
Sparrow Hawk	Falco sparverius	Fallow Fields and Pastures
Bobwhite	Colinus virginianus	Scrub and Fallow Fields
King Rail	Rallus elegans	Marshes
Clapper Rail	Rallus longirostris	Marshes
Virginia Rail	Rallus limicola	Marshes
Sora	Porzana carolina	Marshes
Black Rail	Laterallus jamaicensis	Marshes
Common Gallinule	Gallinula chloropus	Marshes
Killdeer	Charadrius vociferus	Pastures
American Woodcock	Philohela minor	Scrub and Fallow Fields
Upland Plover	Bartramia longicauda	Hayfields
Spotted Sandpiper	Actitus macularia	Tidal Estuaries

TABLE D3 (cont'd)

Herring Gull	Larus argentatus	Tidal Estuaries
Mourning Dove	Zenaidura macroura	Fields
Yellow-Billed Cuckoo	Coccyzus americanus	Woods
Black-Billed Cuckoo	Coccyzus erythropthalmus	Woods
Screech Owl	Otus asio	Deciduous Woods
Great Horned Owl	Bubo virginianus	Woods
Barred Owl	Stryx varia	Bottomland Forest
Chuck-Will's Widow	Caprimulgus carolinensis	Pine Woods and Scrub
Whip-Poor-Will	Caprimulgus vociferus	Woods
Common Night Hawk	Chordeiles minor	Fields
Ruby-Throated Hummingbird	Archilochus colubris	Bottomland Forest and Suburbs
Belted Kingfisher	Megaceryle alcyon	Tidal Marshes and Rivers
Yellow-Shafted Flicker	Colaptes auratus	Scrub and Suburbs
Pileated Woodpecker	Dryocopus pileatus	Woods
Red-Bellied Woodpecker	Centurus carolinus	Woods
Red-Headed Woodpecker	Melanerpes erythrocephalus	Woods
Yellow-Bellied Sapsucker	Sphyrapicus varius	Bottomland Forests
Hairy Woodpecker	Dendrocopos villosus	Woods
Downy Woodpecker	Dendrocopos pubescens	Woods
Eastern Kingbird	Tyrannus tyrannus	Scrub
Great Crested Flycatcher	Myiarchus crinitus	Woods
Eastern Phoebe	Sayornis phoebe	Scrub
Acadian Flycatcher	Empidonax virescens	Woods
Eastern Wood Pewee	Contopus virens	Woods
Horned Lark	Eremophila alpestris	Plowed Fields
Tree Swallow	Iridoprocne bicolor	Marshes
Bank Swallow	Riparia riparia	Tidal Estuaries
Rough-Winged Swallow	Stelgidopteryx ruficollis	Rivers
Barn Swallow	Hirundo rustica	Hayfields
Purple Martin	Progne subis	Suburban Gardens
Blue Jay	Cyanocitta cristata	Woods
Common Crow	Corvus brachyrhynchos	Fields
Fish Crow	Corvus ossifragus	Tidal Estuaries
Carolina Chickadee	Parus carolinensis	Woods
Tufted Titmouse	Parus bicolor	Woods
White-Breasted Nuthatch	Sitta carolinensis	Deciduous Woods
Brown-Headed Nuthatch	Sitta pusilla	Pine Woods
Brown Creeper	Certhia familiarsis	Woods

TABLE D3 (cont'd)

TABLE D3

House Wren	Troglodytes aedon	Scrub and Suburbs
Bewick's Wren	Thryomanes bewickii	Scrub
Carolina Wren	Thryothorus ludovicianus	Scrub
Long-Billed Marsh Wren	Telmatodytes palustris	Marsh
Short-Billed Marsh Wren	Cistothorus platensis	Marsh and Hayfields
Mockingbird	Mimus polyglottos	Scrub and Suburbs
Catbird	Dumetella carolinensis	Scrub and Suburbs
Brown Thrasher	Toxostoma rufum	Scrub and Suburbs
Robin	Turdus migratorius	Pastures and Suburbs
Wood Thrush	Hylocichla mustelina	Woods
Veery	Hylocichla fuscescens	Bottomland Forest
Eastern Bluebird	Sialia sialis	Scrub and Fields
Blue-Gray Gnatcatcher	Polioptila caerulea	Bottomland Forests
Cedar Waxwing	Bombycilla cedrorum	Scrub and Suburbs
Loggerhead Shrike	Lanius ludovicianus	Scrub
Starling	Sturnus vulgarus	Scrub and Fields
White-Eyed Vireo	Vireo griseus	Scrub and Hedgerows
Yellow-Throated Vireo	Vireo flavifrons	Woods
Solitary Vireo	Vireo solitarius	Deciduous Woods
Red-Eyed Vireo	Vireo olivaceus	Woods
Warbling Vireo	Vireo gilvus	Scrub
Black and White Warbler	Mniotilta varia	Woods
Prothonotary Warbler	Protonotaria citrea	Swamp and Scrub
Worm-Eating Warbler	Helmitheros vermivorus	Deciduous Woods
Parula Warbler	Parula americana	Bottomland Forests
Yellow Warbler	Dendroica petechia	Scrub
Yellow-Throated Warbler	Dendroica dominica	Pine Woods and Sycamore
Prairie Warbler	Dendroica discolor	Scrub
Ovenbird	Seiurus aurocapillus	Deciduous Woods
Louisiana Waterthrush	Seiurus motacilla	Plowed Fields
Kentucky Warbler	Oporornis formosus	Plowed Fields
Yellowthroat	Geothlypis trichas	Bogs in Scrub
Yellow-Breasted Chat	Icteria virens	Hedgerows and Scrub
Hooded Warbler	Wilsonia citrina	Deciduous Woods
American Redstart	Setophaga ruticilla	Woods
House Sparrow	Passer domesticus	Fields and Suburbs
Eastern Meadowlark	Sturnella magna	Hayfields and Pastures
Red-Wing Blackbird	Agelaius phoeniceus	Marshes and Fields

TABLE D3 (cont'd)

Orchard Oriole	Icterus spurius	Scrub
Baltimore Oriole	Icterus galbula	Scrub and Suburbs
Boat-Tail Grackle	Cassidix mexicanus	Marsh
Common Grackle	Quiscalus quiscula	Fields
Brown-Headed Cowbird	Molothrus ater	Fields
Scarlet Tanager	Piranga olivacea	Deciduous Woods
Summer Tanager	Piranga rubra	Deciduous Woods
Cardinal	Richmondena cardinalis	Scrub and Suburbs
Indigo Bunting	Passerina cyanea	Scrub
American Goldfinch	Spinus tristis	Scrub and Suburbs
Rufous-Sided Towhee	Pipilo erythrophthalmus	Scrub and Suburbs
Grasshopper Sparrow	Ammodramus savannarum	Hayfields
Henslow's Sparrow	Passerherbulus henslowii	Fallow Fields
Sharp-Tailed Sparrow	Ammospiza caudacuta	Marsh
Seaside Sparrow	Ammospiza maritima	Marsh
Vesper Sparrow	Pooecetes gramineus	Fields
Chipping Sparrow	Spizella passerina	Scrub and Suburbs
Field Sparrow	Spizella pusilla	Scrub and Fallow Fields
Song Sparrow	Melospiza melodia	Scrub and Fallow Fields

Footnotes:

[1] The birds are listed according to the accepted ornithological practice (family, genus, species); this sequence adheres to the genetic evolution of the families.

[2] Scrub includes secondary-growth trees, underbrush and/or hedgerows.

BIRDS SIGHTED OR HEARD IN PISCATAWAY

TABLE D4

	Common Name	Genus and Species	Type
1	Horned Grebe	Podiceps auritus	Waterfowl
2	Whistling Swan	Olor columbianus	Waterfowl
3	Mallard	Anas platyrhynchos	Waterfowl
4	Ring-Necked Duck	Aythya collaris	Waterfowl
5	Greater Scaup	Aythya marila	Waterfowl
6	Lesser Scaup	Aythya affinis	Waterfowl
7	Bufflehead	Bucephala albeola	Waterfowl
8	Turkey Vulture	Cathartes aura	Land Bird
9	Red-Shouldered Hawk	Buteo lineatus	Land Bird
10	Sparrow Hawk	Falco sparverius	Land Bird
11	Killdeer	Charadrius vociferus	Land Bird
12	Ring-Billed Gull	Larus delawarensis	Waterfowl
13	Herring Gull	Larus argentatus	Waterfowl
14	Bonaparte's Gull	Larus philadelphia	Waterfowl
15	Mourning Dove	Zenaidura macroura	Land Bird
16	Red-Bellied Woodpecker	Centurus carolinus	Land Bird
17	Downy Woodpecker	Dendrocopos punbescens	Land Bird
18	Blue Jay	Cyanocitta cristata	Land Bird
19	Common Crow	Corvus brachyrhynchos	Land Bird
20	Carolina Chickadee	Parus carolinensis	Land Bird
21	Tufted Titmouse	Parus bicolor	Land Bird
22	White-Breasted Nuthatch	Sitta carolinensis	Land Bird
23	Carolina Wren	Thryothorus ludovicianus	Land Bird
24	Mockingbird	Mimus polyglottos	Land Bird
25	Golden-Crowned Kinglet	Regulus Satrapa	Land Bird
26	Starling	Sturnus vulgaris	Land Bird
27	Myrtle Warbler	Dendroica coronata	Land Bird
28	House Sparrow	Passer domesticus	Land Bird
29	Eastern Meadowlark	Sturnella magna	Land Bird
30	Red-Wing Blackbird	Agelaius phoeniceus	Land Bird
31	Common Grackle	Quiscalus quiscula	Land Bird
32	Brown-Headed Cowbird	Molothrus ater	Land Bird
33	Cardinal	Richmondena cardinalis	Land Bird
34	Purple Finch	Carpodacus purpureus	Land Bird
35	American Goldfinch	Spinus tristis	Land Bird
36	Rufous-Sided Towhee	Pipilo erythrophthalmus	Land Bird
37	Slate-Colored Junco	Junco hyemalis	Land Bird
38	White-Throated Sparrow	Zonotrichia albicollis	Land Bird
39	Song Sparrow	Melospiza melodia	Land Bird

Table D 5

FISH OF PISCATAWAY CREEK, MARYLAND
from Tsai (1968, unpublished data)

Scientific Name	Common Name
Catastomus commersoni	White sucker
Anguilla rostrata	American eel (PB)
Semotilus corporalis	Fallfish
Rhinichthys atratulus	Blacknose dace
Aphreododerus sayanus	Pirate perch
Notemigonus cryscheucas	Golden shiner (PB)
Semotilus atromoculatus	Creek chub
Unbra pygmaea	Eastern mudminnow
Micropterus salmoides	Largemouth bass (PB)
Notropis cornutus	Common shiner
Clinostomus funduloides	Rosyside dace
Notropis pronce	Swallowtail shiner
Exoglossum maxillingua	Cutlips minnow
Esox niger	Chain pickerel (PB)
Ictalurus nebulosus	Brown bullhead(PB)
Lepomis macrochirus	Bluegill
Cyprinus carpio	Carp (PB)
Erimyzon oblongus	Creek chubsucker
Notropis rubellus	Rosyface shiner
Notropis hudsonius	Spottail shiner (PB)
Lepomis gibbosus	Pumpkinseed sunfish (PB)
Notorus insignis	Margined madtom
Esox americanus	Redfin pickerel (PB)

PB = Fishes likely to be in Piscataway Bay.

Table D6

ANADROMOUS FISHES OF PISCATAWAY CREEK OR FISHES WHICH PRESENTLY ENTER PISCATAWAY CREEK TO SPAWN*

Common Name	Scientific Name
Yellow perch	*Perca flavescens* (L)
White perch	*Morone americana*
Ale wife	*Alosa pseudoharengus* (L)
Blueback herring	*Alosa aestivalis*
American shad	*Alosa sapidissima*
Striped bass	*Morone saxatilis*
Unidentifiable herring (L)	
Probable identification of hicory shad	*Alosa mediocris* (L)
Herring or shad family larvae or eggs	Unidentifiable *clupeid* larvae (L) or eggs**

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* (Verification of presence of a fish species in Piscataway Creek is dependent upon Odell et al 1973).

**This could be a record of American shad larvae or eggs for Piscataway Creek.

L=Actual verification of spawning shown by presence of larvae or eggs in draft samples.

Table D7

IMPORTANT FISHES OF THE LOWER POTOMAC ESTUARY WHICH ENTER BRACKISH WATER*

Common Name	Scientific Name
Sea lamprey	Petromyzon marinus
Stingaree	Dasyatis sabina
Lownose ray	Rhinoptera quadriloba
Atlantic sturgeon	Acipenser oxyrhynchus (SC)
Shortnose sturgeon	Acipenser brevirostrum
Southern longnose gar	Lepisosteus osseus
Hickory shad	Pomolobus mediocris (SC)
Blueback herring	Alosa aestivalis (SC)
Alewife herring	Alosa pseudoharengus (SC)
American shad	Alosa sapidissima (SC)
Menhaden	Brevoortia tyrannus(SC)
Gizzard shad	Dorosoma cepedianum
Chain pickerel	Esox niger (SC)
Redfin pickerel	Esox americanus (SC)
Easterns redhorse	Moxostoma macrolepidotum
Creek chubsucker	Erimyzon oblongus
Carp	Cyprinus carpio (SC)
Goldfish	Carassius auratus (SC)
Golden shiner	Notemigonus crysoleucus (SC)
Spottail shiner	Notropis hudsonius (SC)
Silvery minnow	Hybognathus nuchalis (SC)
Blue catfish	Ictalurus furcatus (SC)
Channel catfish	Ictalurus punctatus (SC)
White catfish	Ictalurus catus (SC)
Striped bass	Roccus saxatilis (SC)(A)
Largemouth bass	Micropterus salmoides (SC)
Pumpkinseed	Lepomis gibbosus (SC)
Red belly sunfish	Lepomis auritus (SC)
White crappie	Pomoxis annularis (SC)
Yellow perch	Perca flavescens (SC)(A)
Bluefish	Pomatomus saltatrix (SC)(A)
Cabio	Rachycentron canadum (SC)
Amberjack	Seriola dumerili (SC)
Pigfish	Orthopristis chrysopterus (SC)
Spot	Leiostomus xanthurus)SC)
Silver perch	Bairdiella chrysura (SC)
Red drum	Sciaenops ocellata)SC)
Atlantic croaker	Micropogon undulatus (SC)(A)
Black drum	Pogonias cromis (SC)
Northern King whiting	Menticirrhus saxatilis (SC)
Spotted seatrout	Cynoscion nebulosus (SC)
Weakfish	Cynoscion regalis (SC)
Sheepshead	Archosargus probatocephalus (SC)
Spadefish	Chaetodipterus faber (SC)

TABLE 7 (cont'd)

Spanish mackerel	*Scomberomorus maculatus* (SC)
Harvestfish	*Peprilus paru*)SC)
Summer flounder	*Paralichthys dentatus* (SC)(A)
Winter flounder	*Pseudopleuronectes americanus* (SC)
Hogchoker	*Trinectes maculatus*
Toadfish	*Opsanus tau*
Brown bullhead	*Amerirus nalales* (SC)
American eel	*Anguilla rostrata* (SC)(A)
Needlefish	*Strongylura marina*
White perch	*Morone americana* (SC)(A)

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* Adapted from Mansueti, 1950 and Mansueti, unpublished, and amended by U.S. Dept. of Commerce 1974.
A= Abundant
SC=Sports or Commercial fishes

TABLE D8

POLLUTED WATER ASSOCIATION

Organisms	Scientific Name	Common Name
Segmented	*Tubifex*	Sludgeworms
Worms	*Limnodrilus*	sludgeworms
Leeches	*Helobdella stagnalis*	
Insects	*Culex pipiens* *Chironomus plumosus* *Eristalis tenax*	mosquito bloodworms rat-tailed maggot
Snail	*Physa integra*	
Clam	*Sphaerium*	fingernail clam
Fish	*Cyprinus carpino*	carp

APPENDIX E

CONVENTIONAL ALTERNATIVES FOR ACHIEVING ADVANCED WASTEWATER TREATMENT

CONTENTS

1. Unit Processes
    - (a) Phosphorus Removal:
        - (1) Biological Processes
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        - (3) Evaluation
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        - (3) Ion Exchange
        - (4) Breakpoint Chlorination
        - (5) Evaluation
    - (c) Organics Removal:
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        - (2) Physical-Chemical Processes
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APPENDIX E

CONVENTIONAL ALTERNATIVES FOR ACHIEVING ADVANCED WASTEWATER TREATMENT

1. Unit Processes.

(a). Phosphorus Removal:

(1) Biological Processes. Conventional biological wastewater treatment processes generally remove only 20 to 40 percent of the incoming phosphorous. This is accomplished when the phosphorous joins into the biological cell material and is settled with the biological solids and removed. However, much of the phosphorous is usually recycled to the plant via the supernate from conventional sludge treatment processes. Significant increase in phosphorous removal in activated sludge processes have been realized when "luxury uptake" of the biological process is promoted and when sludge is treated to prevent the recycling of phosphorous.

Observations of enhanced phosphorus removals have been made in full-scale conventional activated sludge units ranging in capacity from 10 to 100 mgd, and the removals have been confirmed by repeated long-term analytical observations. Therefore, in searching for a minimum cost alternative for phosphorus removal in municipal wastewater treatment, this approach deserves serious consideration.

Roy F. Weston, Inc. conducted a full-scale study at Baltimore's Back River Treatment Plant to determine the cause of the enhanced phosphorus removal and to develop operational control methods to maximize the removal of phosphorus. The following procedures were found to be necessary to achieve phosphorus removals of greater than 80 percent:

1. Proper handling of the phosphorus-rich wasted activated sludge to prevent recycle of phosphorus to the treatment system.
2. Design of the aeration tank for a true plug-flow configuration.
3. Provision of adequate aeration capacity to maintain a minimum dissolved oxygen concentration of 2.0 mg/l.
4. Wasting of excess activated sludge on a continuous basis and avoidance of slug wasting of sludge.
5. Maintaining secondary clarifier operations to minimize development of anerobic conditions in the sludge blanket.

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(2) Chemical Precipitation. Chemical precipitation can result in phosphorus concentrations as low as .2mg/l in municipal wastewater effluents, provided that a high chemical dosage is used and the effluent is polished by filtration. The chemicals most frequently used are lime, and aluminum and iron salts. The major factor in the effectiveness of phosphorus removal by applying lime is pH, with an optimum range of 11 to 12. With aluminum and iron salts, the phosphorus removal efficiency is dependent on pH and on the molar ration of the metallic ion to phosphorus (Al/P or Fe/P). The optimum pH is approximately 6.0 for aluminum salts and approximately 5.0 for iron salts. Low phosphorus concentrations in treated wastewaters can be achieved by using aluminum or iron at dosages of at least 2.5 times the metal-to-phosphorus stoichiometric molar ratio. Applying a combination of lime and metallic salts to precipitate phosphate may shift the optimum pH to an intermediate value between the optimum pH values of these materials used individually. Polymer is frequently used as a coagulation aid in the removal of fine suspensions.

Three basic process schemes for the removal of phosphorus by chemical treatment are shown in DWG.B.2. Scheme 1 represents the simplest chemical treatment process and uses straight chemical precipitation, coagulation, and settling. Scheme 1A is used to polish the effluent of Scheme 1 through filtration and/or carbon absorption; effluent from Scheme 1 can be treated further by additional biological treatment as indicated in Scheme 1B.

Scheme 2 represents combined chemical-biological treatment. Chemicals may be added within or at the end of the aeration tank; filtration and/or activated carbon absorption may also be used for further purification as indicated in Scheme 2A, or the effluent, which is equivalent to a low-phosphorus, low-organic secondary effluent can be discharged directly if acceptable.

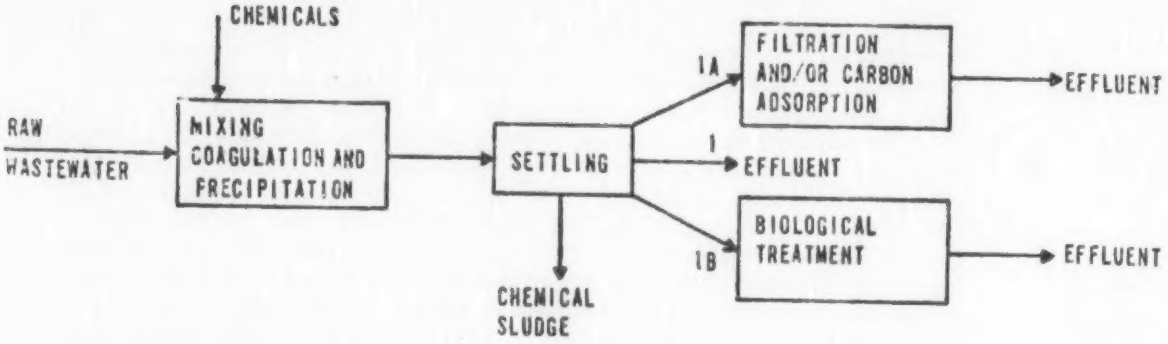
Scheme 3 represents the common advanced wastewater treatment process, with chemical treatment following secondary treatment. Filtration and/or other unit processes may be added to further purify the effluent if required to meet effluent quality criteria.

(3) Evaluation. Although the biological process for phosphorus removal may not be able to reduce concentration to the desired levels by itself, this process may be economically desirable in conjunction with chemical precipitation of phosphorus. Chemical precipitation would require heavy chemical dosage resulting in additional sludge disposal problems. The biological process could reduce these problems by reducing the phosphorus concentration

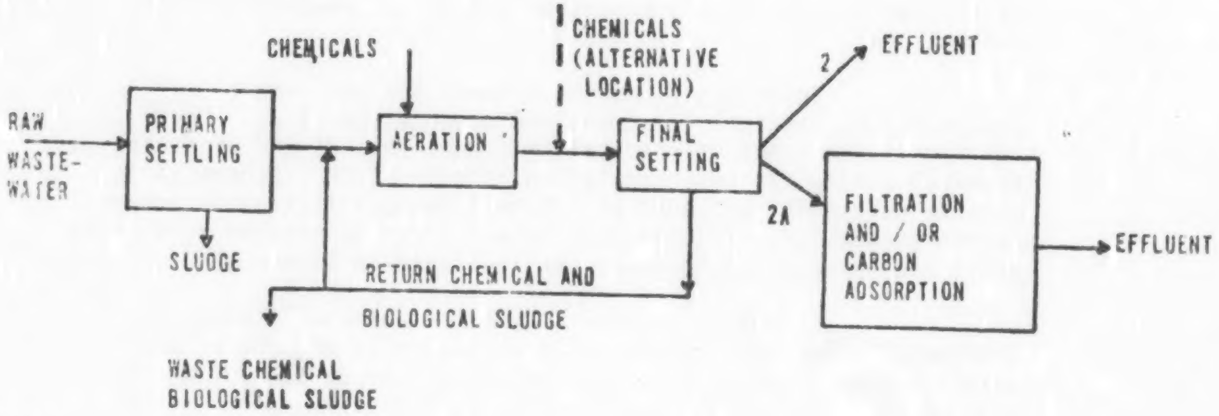
WASHINGTON SUBURBAN SANITARY COMMISSION

PROCESS SCHEMES FOR CHEMICAL TREATMENT EMPHASIZING PHOSPHOROUS REMOVAL

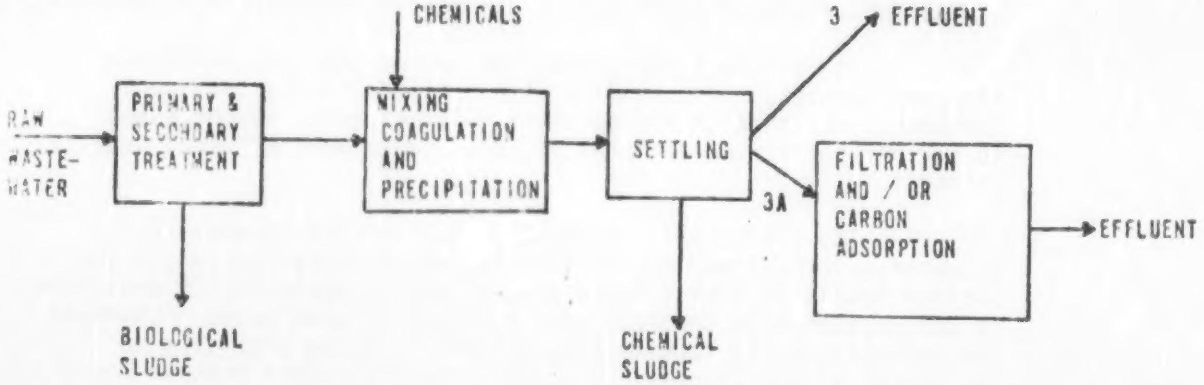
SCHEME 1



SCHEME 2


RAW WASTE-WATER
PRIMARY SETTLING
SLUDGE
CHEMICALS
AERATION
CHEMICALS (ALTERNATIVE LOCATION)
FINAL SETTING
2
EFFLUENT
2A
FILTRATION AND / OR CARBON ADSORPTION
EFFLUENT
RETURN CHEMICAL AND BIOLOGICAL SLUDGE
WASTE CHEMICAL BIOLOGICAL SLUDGE

SCHEME 3


RAW WASTE-WATER
PRIMARY & SECONDARY TREATMENT
BIOLOGICAL SLUDGE
CHEMICALS
MIXING COAGULATION AND PRECIPITATION
SETTLING
CHEMICAL SLUDGE
3
EFFLUENT
3A
FILTRATION AND / OR CARBON ADSORPTION
EFFLUENT

DWG. B-2

ROY F. WESTON, INC.

substantially before chemical treatment. This could reduce the amounts of chemicals needed and the volume of sludge created.

(b) Nitrogen Removal:

(1) Biological Process. Most of the nitrogen in raw municipal wastement is in the form of ammonia and organic nitrogen. Removal of nitrogen in biological treatment processes may be achieved through: (a) up-take by microorganisms through use of nitrogen as a nutrient, with subsequent removal with waste activated sludge; (b) removal of particulate and colloidal particles which contain nitrogen, by sedimentation; and (c) by biological nitrification and denitrification. Nitrification-denitrification will produce better effluent quality and controlled performance, but it requires special conditions and efforts as compared to the conventional biological treatment processes. The nitrogen removal efficiency of controlled separate microbial nitrification-denitrification systems has been reported to be in the range of 80 to 95 percent of influent total nitrogen, while removal efficiencies for conventional mixed biological systems are in the range of 10 to 30 percent and are very inconsistent.

During biological treatment, organic nitrogen materials, such as urea and protein, are converted to ammonia. Under aerobic conditions, ammonia is oxidized biologically to nitrite, which in turn is oxidized to nitrate. Two major groups of nitrifying bacteria are responsible for this nitrification process: nitrosomonas for oxidation of ammonia to nitrites, and nitrobacter for conversion of nitrites to nitrates. Nitrifying bacteria have a slow growth rate as compared to the other microorganisms most commonly encountered in biological wastewater treatment. Because of this slow growth rate, mixed systems do not function well in converting ammonia to nitrate unless long detention times are provided. (This would limit the growth of other microorganisms in that portion of the system where the food-to-microorganism ratio is low.) Therefore, for control of the nitrification process, a separate biological system is preferred to insure that the specialized bacterial culture is maintained at optimum environmental conditions.

The nitrification process is more sensitive to variations in pH and temperature than are other biological processes. The optimum pH is 8.4, with a workable operating range of 7.8 to 8.9. As the pH rises to 8.9 or falls to 7.8, the nitrification rate will drop to 90 percent of the maximum rate. As the pH reaches as high as 9.8 or as low as 7.0, the rate becomes less than 50 percent of the maximum. The rate of nitrification increases through the temperature range of 5^{o}C to 30^{o}C.

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It is generally accepted that nitrification is a zero-order reaction for a normal municipal wastewater, i.e., the rate of nitrification is constant and independent of the residual concentration of ammonia nitrogen as long as the bacteria population is sufficiently large. Since nitrification is a zero-order reaction, the quantity of nitrifying bacteria present in the system will dictate the time required for nitrification. It is generally recommended that influent BOD concentration to nitrification systems be kept below 50 mg/l. However, it has been reported that no adverse effects have occurred with instantaneous BOD concentrations increasing from 50 mg/l to 110 mg/l or decreasing from 50 mg/l to 5 mg/l. The recommended minimum dissolved oxygen concentration in the nitrification tank is 1 mg/l.

Facultative microorganisms are capable of using chemically-bound oxygen in the form of nitrates and nitrites under anaerobic conditions. The resulting reduction of nitrates and nitrites produces nitrogen gas, which is released from the system. However, since a highly nitrified wastewater contains insufficient carbonaceous material to force completion of the denitrification reaction, a carbon source must be supplied. Raw sewage, return activated sludge, and various organic wastes have been used as carbon sources, but these generally have been unsatisfactory because a highly-treated effluent is necessary, and because variations in the quality of these food sources make control of the system very difficult, if not impossible.

Methanol has been found to be the best source of supplemental carbonaceous matter to date; it has a minimum of side effects and causes very little operational control difficulty.

Theoretically, each pound of nitrate nitrogen would require 1.9 pounds of methanol for its reduction. However, in practice, 3.0 to 3.5 pounds of methanol are required per pound of nitrate nitrogen, to account for carbon used by the organisms for cell synthesis in biological process and the amount of carbon consumed by the bacteria in producing the anaerobic condition. Supplemental carbon feed must be controlled very closely to insure that sufficient carbon is available for maximum denitrification while avoiding an excess, which is not only a waste of chemical but will also impose a BOD residual on the effluent.

(2) Air Stripping. This process is capable of removing nitrogen from wastewater only when the nitrogen is in the form of dissolved ammonia as (NH_3). Therefore, it is necessary to convert

the ammonium ions (NH_4^+) to ammonia.

$$NH_4^+ + OH \qquad NH_3 \qquad +H_2O$$

Air temperature has an important effect on stripping efficiency. 85 percent ammonia removal can be achieved at an air temperature above 70°F. However, ammonia removal decreases as the temperature drops. At temperatures approaching 40°F, the ammonia removal decreases to about 60 percent; below 40°F the process becomes undependable because of increased surface tension, and at still lower temperatures, icing becomes a problem. Two other factors also affect the rate of transfer of ammonia gas from water to the atmosphere:

(a) Minimizing surface tension at the air-water surface by continuous formation and coalescence of the water droplets.

(b) Minimizing ammonia concentration in the ambient air by rapid circulation of air and agitation of the droplets. An air supply of at least 550 cu. ft. per gallon of wastewater is necessary to insure ammonia removals of 85 percent under warm weather conditions.

Serious limitations have been realized in applying air stripping for ammonia removal in the northern part of the United States during the cold months:

(a) It has not been practical to remove ammonia effectively from wastewater by this process when air and water temperatures drop below 70°F.

(b) The formation of hard scale and crust by the deposition of insoluble calcium carbonate (formed by $Ca(OH)_2$ combining with the carbon dioxide in the atmosphere) may occur and cause loss of efficiency and eventual complete plugging of the stripping system.

(c) A potential air pollution problem also exists unless an ammonia recovery system is included.

(3) Ion Exchange. Selective ion exchange processes have been used effectively for ammonia nitrogen removal. Natural zeolite, clinoptilolite, or certain synthetic cation exchangers may be used for selective substitution of ammonium ions in the presence of sodium, magnesium and calcium ions. Regeneration of exhausted exchangers may be accomplished by using an alkaline solution such as lime slurry or sodium hydroxide solution which provides hydroxyl ions to react with ammonium ions. The spent regenerant, bearing concentrated ammonium ions, would have to be disposed of by other methods such as air stripping or electrolytic treatment.

Although the ion exchange process is a reliable and effective means for the removal of ammonia, the high cost, physical plugging, organic fouling, loss of capacity upon regeneration, and the requirement for the treatment of the regenerant makes the process uneconomical in most instances at the present time.

(4) Breakpoint Chlorination. Breakpoint chlorination is defined as the addition of chlorine to water until the chlorine demand has been satisfied and further additions result in a residual that is directly proportional to the amount added beyond the breakpoint. Chlorination of water containing ammonia nitrogen to the breakpoint will convert ammonia to nitrous oxide, an insoluble gas. Complete oxidation of ammonia nitrogen to nitrous oxide at breakpoint will require about 9 to 10 mg/l of chlorine per mg/l of ammonia oxidized. The addition of an alkali is also essential, to neutralize the hydrochloric acid formed during the chlorination process. To treat wastewater of high ammonia concentration by breakpoint chlorination is rather expensive. However, the ability of this process to remove trace amounts of ammonia to zero concentration is unique. For this reason, breakpoint chlorination for the removal of ammonia may be used as a supplemental process for removing the last traces of ammonia where this is necessary. Breakpoint chlorination is not effective for removal of nitrite or nitrate nitrogen because it is applicable only to unoxidized nitrogen. Thus, its use is restricted to non-biological systems or to those biological systems in which nitrification is deliberately inhibited. Definitive information is not available at this time on the acceptability and reliability of this latter approach for biological systems.

It should be noted that tests have been performed which demonstrate that essentially complete coliform bacteria removal can be attained through this process. In addition, significant virus reduction has also been reported.

(5) Evaluation: Biological treatment is the only process which can reduce nitrogen in any form to the level required and appears to be a reasonable alternative. Breakpoint chlorination only removes ammonia nitrogen. However, if a high precentage of the total nitrogen is in the form of ammonia nitrogen, breakpoint chlorination could provide adequate nitrogen reduction. Because of the limitation noted in the preceeding paragraphs, other nitrogen removal processes do not appear to be feasible.

(c) Organics Removal:

(1) Biological Processes. Aerobic biological systems have been demonstrated to be very effective and economical for the removal of biodegradable organics. Generally, aerobic treatment systems may be categorized into two groups: suspended sludge and fixed growth. The most commonly used suspended-sludge systems are activated sludge and aerated lagoon, and the principal fixed-growth systems are trickling filter and rotating disc. The conventional activated sludge process has consistently demonstrated its capability to achieve 90 percent of greater removals of BOD_5 from domestic wastewaters, while the fixed-growth systems have been somewhat less effective.

The BOD removal reactions occurring in an activated sludge system although biochemically complex, are based on several fundamental principles. Biodegradable organic matter is used as a source of food by the microorganisms comprising the biomass. In the process of assimilation, a fraction of the organic matter is biochemically oxidized to obtain the energy necessary for activity, growth, and cell maintenance. The remainder of the destructible organic matter is assimilated and biochemically synthesized into new cell material. Oxygen is utilized in the destruction and regeneration of cellular materials. The separation of the excess biomass is an essential part of the activated sludge process. It is the disposal of the excess biomass and the aforementioned consumption of energy during assimilation that makes the removal of soluble BOD possible.

Since a biological system is a living system, its performance and reliability are dependent upon the stability of the growth environment and the absence of inhibitory elements. These inhibitory elements include extremes in pH and temperature, high dissolved solids, and the presence of toxic substances. Optimum aerobic BOD_5 removal reactions occur: in the pH range of 6.0 to 8.5; at temperatures between 10^o and 40^oC; with total dissolved solids concentrations of less than about 1 percent; and in the absence of toxic substances, such as certain heavy metals or specific complex organics.

(2) Physical-Chemical Processes. Chemicals were used in the treatment of municipal wastewaters long before the development of biological treatment. The primary purpose of chemical treatment of wastewater was to promote coagulation of sewage solids, thus increasing the degree of removal of suspended solids and BOD in primary treatment facilities. Chemical coagulation and sedimentation of raw sewage can achieve BOD removals of 50-70 percent. Because it was practically impossible to remove the finely divided floc by plain sedimentation, filtration processes were introduced to improve effluent quality. Filtration of the chemically-treated and settled wastewaters may increase the BOD reduction to the 70 to 85 percent range.

In recent years, because of the eutrophication in impoundments, lakes, and streams, resulting from fertilization by organic and inorganic nutrients, chemical treatment methods have been used to remove phosphorus as well as solids and other undesirable constituents in wastewater. This subject was discussed in more detail in a previous section.

The adoption of more stringent standards on organic content in wastewater effluent has led to the incorporation of the activated carbon absorption process into the wastewater treatment scheme. The carbon absorption process has been used to treat secondary effluent, and more recently, it has been applied directly to chemically treated raw wastewater. Raw wastewaters can be coagulated and settled, then filtered and treated by activated carbon absorption to produce an effluent BOD of 5 to 10 mg/l and a COD of less than 30 mg/l.

(d) Effluent Polishing:

In order to meet effluent limitation, additional treatment processes will be required for the removal of BOD and suspended solids. An economic comparison of some of the effluent polishing processes discussed below is shown in Table E-1.

(1) Microscreening. Micro-screens are mechanical filters which consist of a rotating drum with a peripheral screen. Influent wastewater enters the drum and passes radially outward through the screen, with decomposition of solids on the inner surface of the drum screen. At the top of the drum, pressure jets remove deposited solids. This backwash water is then collected and returned to the head of the plant. Operational data from various plants are presented in Table E-2. It has been demonstrated that microscreening is not an efficient method of removing chemical floc from coagulated effluent. The floc tends to shear and penetrate the filtering media. This process, therefore, would not be practical following a chemical precipitation process.

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TABLE E-1

Economic Comparison of Various Effluent Polishing Processes
(ENR Index 1500)

Design Flow mgd	Capital Costs Thousands of Dollars					Yearly Costs[1] cents/1,000 gallons			
	Deep[2] Aerated Lagoon	Micro-[3] straining	Sand[3] Filters	MBF[4]	Multi-Media[5] Filters	Deep[6] Aerated Lagoon	Micro-[3] straining	Sand[3] Filters	MBF[4]
1.0	—	39	120	302	80	—	4.5	7.6	14
4.0	270	135	290	—	200	2.0	3.9	4.6	—
10.0	—	300	530	—	350	—	3.7	3.4	--

[1] Yearly costs include: amortization and interest at 4.5 percent for 25 years, operating and maintenance costs.

[2] Capital cost data obtained from Pierce (21).

[3] Cost data obtained from Smith and McMichael (22).

[4] MBF cost data obtained from Bell, et al (12) include operation and maintenance costs.

[5] Capital cost data obtained from Neptune Microfloc (23).

[6] Costs estimated by using information furnished in Pierce (21).

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Table E-2

Microstrainer Operational Data

Location	Plant Size mgd	Feed Type	Fabric Opening microns	SS Removal percent	Effluent SS mg/l	BOD Removal percent	Effluent BOD mg/l	Backwash % of flow	Refe
Brampton, Ontario	0.1	A.S.[1] Effluent	23	57	—	54	—	—	
Lebanon, Ohio	Pilot	A.S. Effluent	23	89	1.9	81	—	5.3	
	Pilot	A.S. Effluent	35	73	7.3	61	—	5.0	
Chicago, Illinois	3.0	A.S. Effluent	23	71	≈3.0	74	≈3.0	3.0	
Luton, England	3.6	Effluent from A.S. and T.F.[2]	35	55	7.3	30	—	3.0	1
Bracknell, England	7.2	T.F. Effluent	35	66	5.7	32	8.4	—	9,1

[1] A.S. - Activated Sludge
[2] T.F. - Trickling Filter

(2) Multi-media, Coarse-media, and Moving-bed Filters. Historically, sand filtration has not been an efficient method of polishing secondary treatment plant effluent because of low application rates, high head losses, and the need for frequent backwashing. This is largely because the normal backwashing of a sand filter results in a size-graded filter with the finest grains in the upper layers. The resulting stratification removes the bulk of the suspended matter in the upper levels, with a consequent inefficient use of the remaining depth of the filter.

However, developments in mixed, multi-media, and deep-bed coarse-media filters have necessitated a re-evaluation of the role of filtration in effluent polishing. In general, these modifications permit deeper penetration of the media by the suspended and colloidal contaminants; thus, there is a more effective utilization of the filter depth as compared to conventional sand filters. The increased utilization of filter depth is somewhat offset by the fact that increased backwashing rates and larger quantities of washwater are required to backwash the media properly.

Deep-bed coarse-media sand filters are a modification of the typical rapid sand filter. The deep-bed filter has a minimum of 4 feet of media as compared to the 2.5 feet or less of the usual rapid sand filter. The media in a deep-bed filter will generally range between 1 and 3 mm. in diameter, while the media in the rapid sand filter typically are less than 1 mm. in diameter.

In addition to course, mixed, and multi-media filters, a new filtering technique known as a moving-bed filter (MBF) has been developed by Johns-Manville Corporation. The unit is basically a sand filter, but as the filter surface becomes clogged, the filtering medium is moved forward by means of a hydraulically-actuated mechanical diaphragm. The clogged filter surface is removed mechanically or by gravity, to the extent that a fresh and clean filtering surface is exposed to the incoming chemically treated liquid. The unit is thus a form of countercurrent extraction device which has the capability of functioning on a continuous basis and does not have to be taken off stream for cleaning or backwashing.

Table E-3 contains operational data from some of the various filtration processes previously discussed. Based on the available data, the mixed and coarse-media filters have significantly higher application rates while still maintaining a high degree of solids removal. However, it must be pointed out that the data for the MBF were developed for a phosphate removal study and therefore, if BOD and suspended solids removals were the only considerations, the alum dosages could probably be reduced.

TABLE E-3

Effluent Polishing Results - Filtration

Filter Type	Feed Type	Media Size mm.	Filter Depth ft.	Hydraulic Loading gpm/sq.ft.	SS Removal percent	Effluent SS mg/l	BOD Removal percent	Effluent BOD mg/l	Reference
Deep-Bed Coarse-Media									
Gravity downflow	T.F.[1] Effluent	1.0-2.0	—	6	70	5.7	55	—	13
Gravity downflow	T.F.[1] Effluent	0.9-1.7	2-3	3	67	—	58	—	14
Pressure upflow	T.F.[1] Effluent	0.9-1.7	5	3	85.5	5.0	74	2.5	14
Pressure upflow	A.S.[2] Effluent	0.9-1.7	5	3	77	—	—	—	14
Nepture Microfloc Mixed-Media	E.A.[3] Effluent	0.25-2.0	2.5	5	74	—	88	—	15
Moving-Bed	T.F.[4] Effluent	0.6-0.8	4.2	2	47	—	71	—	12
	T.F.[5] Effluent	0.6-0.8	4.2	2	67	—	80	—	12

[1] T.F. - Trickling Filter
[2] A.S. - Activated Sludge
[3] E.A. - Extended Aeration
[4] 100 mg/l alum and 0.2-0.75 mg/l anionic polymer
[5] 200 mg/l alum and 0.2-0.75 mg/l anionic polymer

(3) Activated Carbon. The absorption of organic materials from wastewater onto the activated carbon involves a complex physical and chemical interaction. Biological degradation of absorbed materials also occur and can significantly enhance the overall treatment performance. The ability of activated carbon to absorb large quantities of dissolved materials from wastewater is due to its highly porous structure and to the resulting large surface area which provides many sites for the absorption of dissolved materials. Activated carbon requires regeneration when its absorptive capacity is exhausted.

Granular activated carbon has been used successfully at Lake Tahoe, Pomona, and Nassau County. Experience at these places demonstrate the ability of activated carbon to produce effluents with low levels of organics. Some operating results as well as design parameters for these carbon column installations are shown in Table E-4.

Powdered activated carbon provides very high removal rates so that efficient removal can be provided in a very short contact time. In addition, the equipment associated with the liquid processing portion of the process is simpler than that associated with granular carbon. However, the impracticability of economical regeneration has restricted the use of powdered activated carbon, although this problem is being resolved.

(4) Ozonation. When ozone is injected into wastewater, it provides for the oxidation of organic materials and for disinfection. Although this process would allow for effluent polishing and disinfection in one process, it involves complex mechanical equipment for compressing, deaerating, and purging of CO_2 and N_2 from recycled gas. There is a lack of plant scale experience with this process which leaves doubt as to its reliability and costs under operational conditions. However, the process has been used for disinfection of portable water supplies, especially in Europe, and has been proposed for several sewage treatment plants throughout this country. Recent chlorine shortages with the corresponding rise in chlorine prices, coupled with improved ozonation technology, has prompted increased interest in ozonation. This interest, however, is somewhat tempered by increased electrical power costs resulting from the recent oil shortages. Electrical power consumption is the major operational cost incurred in ozone generation.

(5) Polishing Lagoons. Polishing Lagoons offer an opportunity for increased organic and solids removal at a minimum cost. However, a substantial isolated area should be provided with this process. It also should be noted that consistent attainment of the

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Table E-4

Summary of Operating Results Using Activated Carbon for Tertiary Treatment

	Pomona		Lake Tahoe		Nassau County	
Operating Data						
Capacity	200 gpm		1,800 gpm		400 gpm	
Source of Waste	Domestic		Domestic		Domestic	
Secondary Treatment	Standard Activated Sludge		Standard Activated Sludge		High-rate Activated Sludge	
Pre-treatment	Chlorination		Coagulation and Filtration		Coagulation and Filtration	
Carbon Type	16 x 40 mesh		8 x 30 mesh		8 x 30 mesh	
Column Configuration	4-Stage Downflow		2-Upflow in Parallel		4-Stage Downflow	
Column Dimensions	6' dia. x 9'deep		12' dia. x 14' deep		8' dia. x 6' deep	
Nominal Contact Time	36 minutes		13 minutes		24 minutes	
Loading Rate	7 gpm/sq.ft.		8 gpm/sq.ft.		7.5 gpm/sq.ft.	
Carbon Column Performance	Influent	Effluent	Influent	Effluent	Influent	Effluent
COD, mg/l	47	10	20-30	2-10	–	5
BOD, mg/l	–	–	5-20	2-5	–	–
Color, Pt-Co Units	30	3	20-50	5	–	–
Carbon Dosage	350 lbs/million gallon		250 lbs/million gallon		500 lbs/million gallon	

Source: Zanitch and Morand (19)

desired effluent quality may be difficult with this process. Because of these factors, this process does not appear to be feasible.

(e) Disinfection:

Chlorination is the most often used process for disinfection at municipal wastewater treatment facilities in the United States. It has proved to be an efficient and economical disinfectant when adequate contact time and mixing are provided. However, the effects of chlorine on receiving streams are currently being evaluated and effluent restrictions regarding chlorine may be imposed in the future. Laboratory tests indicate that chlorine residuals can be extremely toxic to aquatic life at low concentrations. Properly designed and operated chlorination facilities should be able to attain effluent chlorine residuals of 0.5 ppm. If adequate dilution is available in the receiving stream, no significant adverse conditions are anticipated. If future developments indicate that lower chlorine residuals are desirable, residuals can be reduced by aeration, treatment with sulfates, and carbon absorption.

Other disinfectants such as ozone are currently being studied by EPA to evaluate their potential use in disinfecting wastewater from treatment plant effluents. At the present time, ozone appears to offer the most promise (see paragraph d(4)). In addition to disinfection, ozone is an excellent virucide, provides for high dissolved oxygen concentrations in the process effluent, oxidizes organic material, and leaves no residual which may be harmful to aquatic life. The lack of a residual in the ozonation process also has a negative impact in that no margin of safety is provided to insure adequate disinfection. The capital costs for ozonation equipment are considerably higher than those for chlorine (approximately four times as expensive). Although chlorine prices have risen considerably, the cost of electrical power needed for ozone generation has also risen to such a degree that ozonation and chlorination operation and maintenance costs are approximately equal. Considering both capital and operational costs, it appears that ozonation would cost approximately 30% more than chlorination facilities.

Although chlorine appears to be the most practical alternative for disinfection at Piscataway at this time, ozonation may become more desirable if dechlorination facilities are required. The availability of chlorine and the cost of electrical power will also be important considerations when comparing chlorination and ozonation. The ozonation alternative should be fully evaluated in any future modification or expansion of the Piscataway facility.

2. Treatment Systems.

(a) Selection of Treatment Alternatives:

The objective in selecting alternative wastewater treatment facilities for the removal of BOD_5, phosphorus, and nitrogen was to consider only those treatment schemes that have been demonstrated as effective in removing these pollutants.

After thorough review of the available treatement processes, two treatment schemes (each consisting of a combination of unit processes) were selected for further evaluation by the applicant. The selection of these combinations of unit processes was affected principally by considerations by optimization and reliability of the overall treatment system in meeting the desired effluent quality. These two treatment schemes are:

(1) Independent physical-chemical treatment including breakpoint chlorination for removal of ammonia nitrogen (IPC).

(2) Three-stage biological treatment with supplemental chemical precipitation of residual phosphorus (TSB).

(b) Independent Physical-Chemical Treatment:

The high cost of advanced wastewater treatment for achieving high levels of treatment, the degree of control, and reliability have been the driving force behind this approach to wastewater treatment. This method involves the complete elimination of biological treatment in favor of chemical and physical treatment techniques. The proposed treatment scheme includes a two-stage lime treatment for coagulating suspended solids and colloidal particles and for precipitating the phosphorus, followed by recarbonation (for pH control) and calcium carbonate recovery. Lime was selected for its low cost, wide application, and high potential for recovery and reuse. But most important, it is very effective as a coagulant and precipitant. The settled effluent is then stabilized by additional carbonation to prevent calcium ions from precipitating as calcium carbonate in subsequent units. Filtration is provided to further remove suspended solids carried over from the lime treatment step. Breakpoint chlorination (with neutralization of the acid formed) follows for the removal of ammonia nitrogen. Finally, activated carbon absorption is provided to remove residual organic matter and excess chlorine residuals. Recalcination facilities are provided for recovering lime from chemical sludge. The spent carbon is regenerated on-site for reuse.

A simplified flow diagram for the independent physical-chemical (IPC) treatment scheme is shown on page __.

The wastewater after pretreatment (bar screen and aerated grit chambers) will enter a mixing zone in one of the two 145'-diameter first-stage reactor-clarifiers and be thoroughly mixed with a lime slurry. This mixing zone will also provide contact with sludge recycled from the bottom of the reactor-clarifier and will serve as a place for addition of coagulant aids. The lime slurry-wastewater mixture will go to a gentle mixing zone and then to a settling zone, equipped with sufficient collection launders to prevent solids overflow. In order to control the sludge composition in the first-stage clarifiers, flexibility is provided to return the second-stage carbonate sludge to the first stage. The expected sludge characteristics and concentrations dictate the need for a heavy-duty sludge-raking mechanism.

The effluent from the first-stage reactor-clarifiers will be neutralized by carbon dioxide to reduce the pH from 11-12 to the 9.5-10 range, favorable for precipitation of calcium carbonate. Two-stage neutralization will be accomplished in concrete basins (50' x 21') into which carbon dioxide-rich flue gas from the recalcination furnace will be introduced and dispersed by a sparger-turbine agitator system. Flue gas feed will be controlled on the basis of pH measurement in the basins.

The carbonated wastewater will flow into the reaction zone of one of the two 145' diameter second-stage reactor-clarifiers. Operation will be similar to that of the first-stage, except that lime slurry will not be added. However, coagulant-aid chemicals could be added, if needed. Lime slurry feeding facilities also are provided as standby. The sludge removed from this unit and the first-stage clarifiers will be discharged to the sludge recovery system.

The effluent from the second-stage reactor-clarifiers will flow to a 40-minute detention time concrete stabilization reactor. Carbon dioxide (from the recalcination furnace flue gas) is added to the wastewater to lower the pH of the wastewater to 8 in order to stabilize the wastewater and prevent post-precipitation of calcium carbonate, and to improve the removal of dissolved organics by carbon absorption in the subsequent step. Again, a sparge-turbine agitator arrangement is employed to disperse flue gases in the liquid.

The stabilized effluent will enter a filter inlet well with a capacity of one million gallons. The functions of the inlet well would be to act as a wet well for the filter feed pumps and to equalize the hydraulic fluctuation of the wastewater flow.

Ten mixed-media gravity filters will be utilized to remove residual suspended solids in the effluent from the third-stage system in normal operation; 9 filters will be on line and one in a standby or backwashing status. The filtration rate of the filter will range from 3 to 6 gpm/sq. ft. All filters will be equipped with automatic backwash, and with surface and air wash facilities. Backwash water will be pumped from the chlorination tank and collected in a decant tank. After a wash, the collected water will be pumped back to the first-stage aeration tanks at a controlled rate.

The filtered effluent will be chlorinated in the chlorination tank for disinfection and removal of ammonia nitrogen. The chlorine dosage will be dictated by the concentration of ammonia and the wastewater flow, on the basis of 10 pounds of chlorine per pound of ammonia-nitrogen to be removed. The pH will be controlled at 8.0 by the addition of sodium hydroxide solution.

The chlorinated wastewater will be pumped down-flow through nine parallel two-stage, 22'-diameter granular activated carbon absorption trains to remove the residual organics. (The effluent from the carbon columns is the final effluent.) Each parallel train will be provided with adequate piping and controls so that either column will be the lead column. One standby absorption train is provided. Each lead column will receive a 10-minute backwash every 24 hours. The backwash water application rate will be sufficient to obtain 40-percent expansion of the carbon bed. When the carbon in a specific absorption column is exhausted, it will be regenerated in the multiple-hearth furnaces.

The excess chemical sludge will be concentrated in two 100'-diameter gravity thickeners. Underflow sludge, concentrated to 8-12 percent dry solids, will be pumped to the three solid-bowl centrifuges for further dewatering. The sludge will be conditioned with flocculating chemicals and then concentrated in solid-bowl centrifuges, which will be capable of processing the average design sludge load in a 20-hour period. However, the centrifuges can be operated at three times the design hydraulic rate of 50 gpm to clarify the lime sludge for removal of calcium apatite. The concentrate will be returned to the plant inlet.

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The sludge cake from the centrifuge (containing 30 percent solids) will be conveyed to the multiple-hearth furnaces, in which a soft-burned, reactive quicklime with high percentages of inert solids will be produced. Part of the reclaimed lime will be reused with fresh lime as make-up, and the remainder, as blowdown, will be disposed of by sanitary landfill.

(c) Three Stage Biological Treatment:

This treatment system constitutes the proposed action and is described and evaluated in Section IV.

(d) Evaluation:

Evaluation of the two treatment and disposal alternatives included considerations of capital and operating costs, and the use of the existing facilities. The opportunity of utilizing the existing equipment makes TSB the more attractive alternative with respect to total capital costs and annual costs. Future expansion plans, however, should consider both the TSB and IPC approaches, with consideration given to using the Model Plant. Since the breakpoint chlorination process will remove only ammonia nitrogen (IPC system), additional evaluation may be required to determine the ability of the process to reduce total nitrogen to required levels. This will be dependent upon the form nitrogen is in at the head of the plant.

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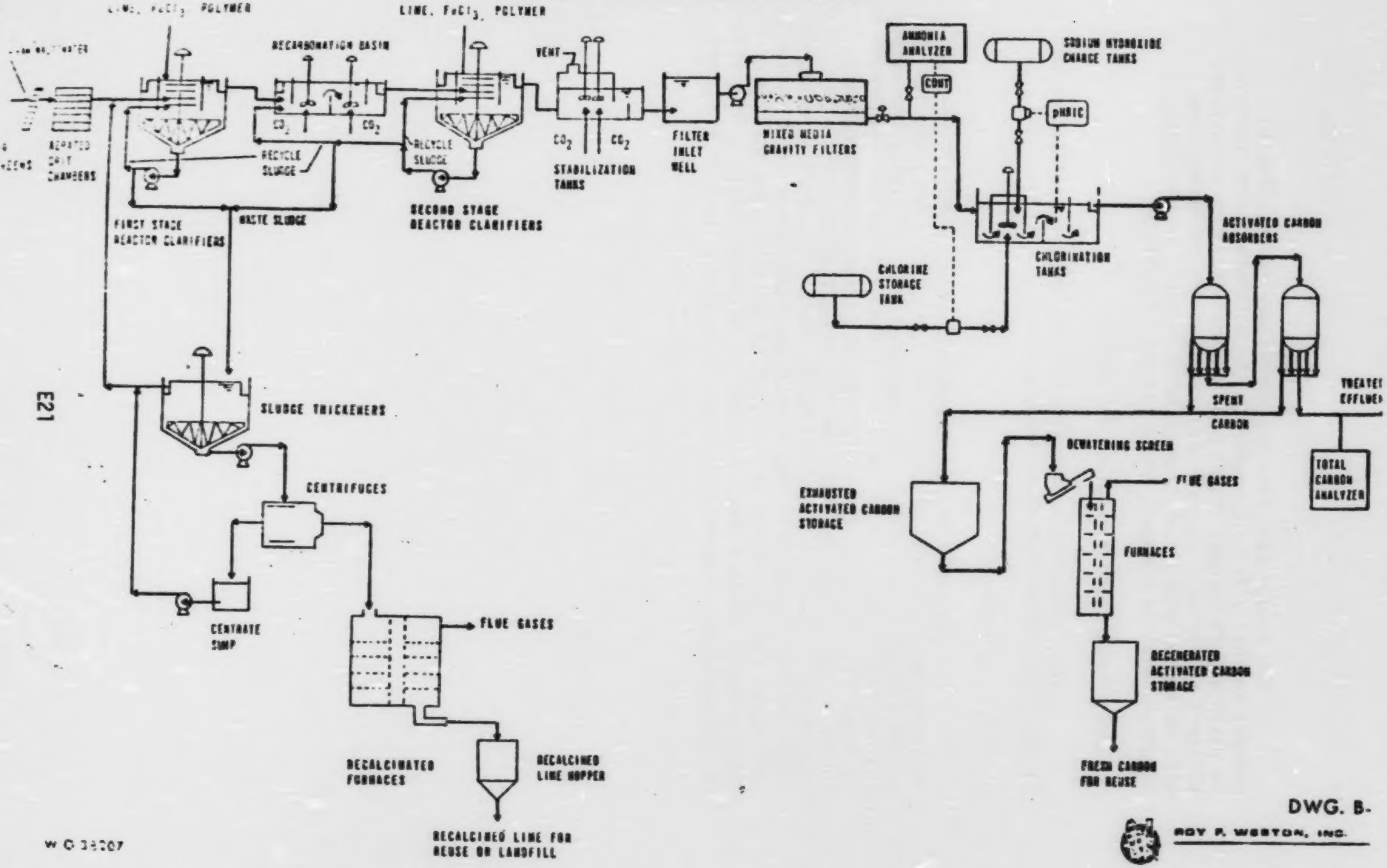
WASHINGTON SUBURBAN SANITARY COMMISSION
PROCESS FLOW DIAGRAM
INDEPENDENT PHYSICAL-CHEMICAL TREATMENT



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DWG. B.

ROY F. WESTON, INC.

APPENDIX F

SLUDGE TREATMENT AND DISPOSAL ALTERNATIVES

CONTENTS

1. Sludge Treatment

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APPENDIX F

SLUDGE TREATMENT AND DISPOSAL [1]

1. Sludge Treatment

(a) Sludge Thickening

This process is used to reduce the liquid volume of the sludge solids which would have to be pumped to other treatment units. These treatment units can therefore be smaller since they will handle less excess liquid. The two major types of sludge thickening operations are gravity thickening and flotation thickening.

A gravity thickener resembles a stirred sedimentation basin except deeper. This method can produce a solids concentration of 8% or greater. In some cases the use of a chemical flocculant will aid in the concentration of the sludge.

Flotation thickening is usually used on sludges formed by biological reactors. In this process sludge is exposed to a liquid rich in dissolved oxygen and under pressure. Reduced pressure in the thickening tank causes air bubbles in the liquid to attach to the sludge particles, causing them to rise to the surface where they are collected for further treatment.

(b) Anaerobic Digestion

In this process anaerobic organisms break down complex molecular structures of the solids and release much of the bound water, while obtaining nutrients and energy from the conversion of the raw solids into more stable organic and inorganic solids. The process takes place in three phases. In acid fermentation (first phase), soluble or dissolved solids are broken down into simple organic acids. In acid regression (second phase), the nitrogenous compounds are decomposed. In methane production (third phase), methane bacteria reduce the organic acids and products of the other two phases to produce methane and carbon dioxide gas.

Anaerobic sludge digestion reduces organic matter into simple compounds, reduces sludge volume, reduces the number of coliform organisms by 99.8% in 30 days, and allows for the release of the remaining water more easily.

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[1] Note: The term "disposal" is used in a general sense recognizing, as was discussed in Section III.D., that the environment is a closed system thus making it impossible to "dispose" of anything.

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Generally anaerobic digestion has been demonstrated as an acceptable process for reducing the volatile content of sewage sludge while at the same time reducing odors and pathogenic bacteria. Methane gas production also provides an added benefit. This system has a high capital and relatively low operating costs.

(c) Aerobic Sludge Digestion

This process is similar to the activated sludge process. In this case, however, sludge is fed into the aeration tank. The process requires adequate mixing and a dissolved oxygen concentration between 1.0 and 1.5 mg/l. A 20 to 30 day detention time is required. Aerobic digestion reduces sludge volume and decomposes organic matter into relatively stable or inert organic and inorganic compounds. The major by-products are water and carbon dioxide.

Generally aerobic digestion has not been widely practiced across the country, and it has been used primarily in small plants. Metcalf & Eddy, Inc.[1] lists the following advantages and disadvantages of aerobic digestion as compared to anaerobic digestion:

(1) volatile-solids reduction approximately equal to that obtained anaerobically,

(2) lower BOD concentrations in supernatant liquor,

(3) production of an odorless, humus-like, biologically stable end product that can be disposal of easily,

(4) production of a sludge with excellent dewatering characteristics,

(5) recovery of more of the basic fertilizer values in the sludge,

(6) fewer operational problems, and

(7) lower capital cost.

The major disadvantage of the aerobic digestion process appears to be the higher power cost associated with supplying the required oxygen. That a useful by-product such as methane is not recovered may also be a disadvantage.

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[1] "Wastewater Engineering" Metcalf & Eddy, Inc., 1972, McGraw -Hill, Inc.

(d) Drying Beds

The drying bed is a device to remove enough water from treated sludge so that it can be handled as a solid material. The drying bed usually consists of a layer of gravel under a layer of sand. Water is removed by drainage and evaporation. When sludge is applied to the bed the release of gases tend to float the solids, leaving a layer of liquor at the bottom which drains through the bed. The major portion of the drainage is accomplished in the first 18 hours. Further drying is due to evaporation.

(e) Sludge Lagoons

Sludge lagoons operate in a manner similar to that of the drying beds and accomplish the same function. Lagoons also have been used for sludge digestion. Although they are inexpensive to build and operate, sludge lagoons may be unacceptable because of their unsightly mess and land requirements. Ground water, soil conditions and chemical composition are important considerations. Lining of the lagoon may be necessary to prevent leaching of pollutants. If digestion is required, aeration of the lagoons may also be desireable to speed up the digestion process and prevent nuisance odors.

(f) Chemical Conditioning

This process prepares the sludge for better and more economical further treatment such as vacuum filtration or centrifuging. Certain chemicals are added to coalesce particles in the sludge which promotes moisture removal. The process requires mixing of sludge and coagulant for proper conditioning and chemical feeders for applying the chemicals.

(g) Elutriation

This process is generally used for the pre-treatment of sludge prior to chemical coalgulation. It involves the washing out of excessive amounts of ammonia and ammonia compounds from the sludge with water or treatment plant effluent. Elutriation consists of thoroughly mixing 1 part of sludge with 2 parts of water and allowing separation for about 6 hours. The elutriate is then decanted and sludge drawn off. The process can reduce the chemicals needed for conditioning requirements up to 80%, reduce the ash content in the filter cake, and minimize the need for using lime as a conditioning chemical. Capital, and operation cost for elutriation equipment must be compared to chemical savings when considering this process.

(h) Centrifuging

This process concentrates sludge in order to enhance its treatment or final disposal. The centrifuge removes water by centrifugal force which throws denser solids to the wall of the centrifuge, outside the flow of the rotating flow stream. The solids are then discharged through a nozzle located in the periphery. Sludges can be concentrated to about 5% solids using this method.

(i) Vacuum Filtration

This process is widely used in the separation of liquids from concentrated suspensions, sludges, and sluries. The basic mechanism of this process is the passing of a cylindrical drum which rotates through a container of sludge. The solids in the container are agitated to keep them in suspension. A vacuum which is applied between the drum deck and filter media causes the water to be removed while sludge is held on the filter media. This process can be used to pretreat sludge before receiving additional treatment or as a final treatment before disposal.

(j) Heat Drying

This process can reduce moisture content in sludge to about 10%. The Flash dryer, rotary kiln dryer, spray dryer, and the multiple-hearth furnace are several of the facilities used for heat drying. Sludge from these processes generally can be burned or used as a fertilizer. The process does require considerable fuel consumption since no attempt is made to use the fuel value of the volatile matter in the sludge.

In a flash dryer, sludge cake mixed with dry sludge is dispersed into a stream of hot gases. A separator is used to remove sludge particulates from the gas stream.

The rotary kiln dryer uses an inclined cylinder in which sludge and hot gases are introduced concurrently. Gases from the process must be treated to eliminate odor problems.

In the spray dryer, sludge is sprayed into a column in which hot gas is flowing. Dried sludge drops to the bottom of the column and particulates are removed from the gas stream by means of a separator.

The multiple hearth furnace is basically an incinerator but uses the heat drying principle to remove excess moisture. Sludge is fed to an upper hearth and moved down to lower hearth until dried.

(k) Incineration

Since most of the sludge mass is combustible, sludge incineration offers an excellent volume and weight reduction of sludge and is more energy efficient than heat drying. The multiple hearth incinerator, the flash incinerator, and the fluidized bed incinerator are a few of general incinerator types used to handle sludge. The fluidized bed incinerator process constitutes the proposed action and is presented in IV.A.

(l) Wet Oxidation

This process oxidizes sludge solids in the liquid phase without mechanical dewatering by the application of energy in the form of heat and pressure, and the introduction of air to oxidize the combustible matter. Different degress of organic matter destruction may be obtained depending upon the temperature and pressure applied. Equipment basic to the process include a reactor, air compressor, heat exchanger, high pressure sludge pumps, sludge grinders, power recovery equipment, and vacuum filters to dewater wet ash. Solids from the process exhibit qualities such as sterility, biological stability, settleability, and drainability which make the end products suitable for ultimate disposal.

(m) Pyrolysis

Pyrolysis reduces sludge volume and produces a sterilized end product. The process involves heating in the presence of limited amounts of oxygen and reduces complex organics to simple materials. It has the potential of eliminating air pollution and producing a useful by product. Application of this process has been limited and is therefore still being evaluated.

(n) Composting

This is an aerobic thermophilic decomposition of organic wastes to a relatively stable humus. Microorganisms convert complex organic coumpounds into simpler materials. The process optimizes the natural decomposition process. Composting is advantageous in that many different types of organic sludge can be composted, sludge would be utilized as a resource, and sludge volumes are reduced and stabilized. However, high production costs, limited technology, and an uncertain market for the compost product usually prevent this process from being seriously considered as a disposal method. Attempts are now being made in the D. C. Area to market sludge from the Blue Plains treatment facility by both governmental agencies and the private sector. The success or failure of these endeavors will determine the marketability of sludge as a soil conditioner or fertilizer in the D. C. Area. The disposal of composted sludge in a sanitary landfill still remains a workable alternative.

(o) Purifax Process

This process is basically an oxidizing process using chlorine as the oxidizing agent. It produces stabilized solids by altering organic compounds by substituting chlorine atoms for hydrogen atoms in the organic compounds. This exchange results in compounds which are no longer available as food for bacteria. There is little change in the amount of total solids and no appreciable reduction in the percent of volatile solids. The process can also result in increased chloride discharges and dissolve participated phosphates. The process is advantageous in that it has a low capital cost. Operating costs are dependent upon the cost and availability of chlorine gas.

(p) Other Processes

Several new processes have been developed which chemically alter the sludge for use as a fill material. Although there have been several successful applications of these processes, their use has been rather limited and additional experience is needed before large scale use can be recommended.

2. Sludge Disposal

The following alternatives assume that the sludge has been adequately treated and is relatively stable and inert.

(a) Ocean Disposal

Current EPA policy in Region III dictates that no new ocean dumping permits will be issued. This alternative, is therefore not acceptable.

(b) Land Application

(1) Burial/Landfill. Treated sludges can be disposed of satisfactorily in a properly located and operated landfill. The disposal site should be remote from public water supplies and recreation areas. The ground water table and soil conditions must also be evaluated. This disposal method is usually simple, effective and inexpensive.

(2) Application as Fertilizer or Soil Conditioner. Treated primary and secondary sludges are somewhat comparable to farm manure in its content of fertilizer constituents except that most of the readily decomposable nitrogen compounds have been removed and most of the potash has been washed out. Dewatered organic sludges are good soil conditioners but weak fertilizers. The City of Milwaukee, Wisconsin sells its' secondary sludge as a fertilizer after it is fortified with nutrients. This method of disposal, however, has proved to be uneconomical in many other cities.

Chemical sludge, unlike organic sludges, have minimal value as a soil conditioner or fertilizer. Unless chemical recovery and reuse is practical, landfill appears to be the most satisfactory method of disposal.

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APPENDIX G

BLUE PLAINS AGREEMENT
JUNE 14, 1974

BLUE PLAINS SEWAGE TREATMENT PLANT
AGREEMENT

Recognizing that further measures are required to ensure that the Blue Plains sewage treatment plant will function adequately until the current expansion of the sewage treatment facilities there is completed, the parties hereto enter into the following agreement which shall be incorporated into the consent decree to be submitted to the Court in the suit captioned State Water Control Board, et al. v. Washington Suburban Sanitary Commission, et al., Civil Action No. 1813-73, which is currently pending in the District Court for the District of Columbia.

The parties hereto agree that the terms of this Agreement supplement but, except as provided below, shall not alter the terms and conditions of the 1970 Memorandum of Understanding or the 1971 Interim Treatment Program Agreement.

1. Definitions
   - (a) Flow - For the purpose of this Agreement, "flow" means the average flow for any twelve consecutive months, hereinafter referred to as the rolling annual average flow.
   - (b) Where the term "100,000 pounds per day of BOD_5" is used herein and in the agreement of October 18, 1971, it means the total discharge of BOD_5 as measured on a monthly average basis from the Blue Plains Treatment Plant including any discharge from the Bolling Field overflow.

(c) For the purposes of this Agreement, "interim chemical addition program" means the chemical addition program, as defined in the 1971 Interim Treatment Program Agreement, at the Blue Plains Plant during the "interim period." The implementation of this program shall enable the Plant to reduce the pollutant load to the River to a maximum of BOD_5 100,000 pounds per day or less, as required at any time by the discharge permit issued pursuant to § 402 of the Federal Water Pollution Control Act.

(d) Interim Period - The "interim period" means that period of time beginning with the date of execution of this Agreement and ending with the date on which the advanced waste treatment facilities at Blue Plains are fully operational, or the date on which permanent sludge handling facilities at Blue Plains are fully operational, or December 31, 1977, whichever date occurs first.

2. Allotted Flows

The parties hereto agree as follows:

(a) For the period until the expanded secondary treatment process with full plant chemical addition is placed into operation at the Blue Plains Plant, the allocation of flows shall be based upon the following premises:

(1) The allocation of flows to each user jurisdiction, as established in the 1971 Interim Chemical Agreement, is expressly conditioned upon the successful

implementation of the interim chemical addition program, which necessarily includes the satisfactory marketing and/or disposal of sludge which is produced by that program. It is anticipated that this program will initially generate approximately 400 tons per day of chemical sludge.

(2) If the interim chemical addition program is successfully implemented, a total flow of 299 MGD shall be permitted to the Blue Plains Plant. See Appendix A which is attached hereto and incorporated herein.

(3) The allocation of that 299 MGD flow among the user jurisdictions for any month shall be that allocation set forth in Table 1 of Appendix A.

(b) After the expanded secondary treatment process with full plant chemical addition is placed into operation, a total flow of 309 MGD shall be permitted to the Blue Plains Plant. The allocation of that 309 MGD among the user jurisdictions shall be that allocation set forth in Table 2 of Appendix A.

(c) (1) Prince George's and Montgomery Counties agree to work out the allocation of flows available to each through the Washington Suburban Sanitary District to the Blue Plains Sewage Treatment Plant at 309 MGD. The allocation between Prince George's and Montgomery Counties shall cover the period between the

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completion of the Anacostia Force Main and the completion and commencement of operation of the advanced wastewater treatment plant at Dickerson, Maryland. In the event that the counties fail to reach such an agreement by diligent negotiation and analysis of the future needs of both counties within 45 days from the date of this Agreement, officials of these two counties agree to have the Governor of the State of Maryland decide the issue and they also agree to accept his decision when so made. In the event the Governor is called upon to make such a decision, he will give due consideration to the unmet development needs in the Prince George's portion of the Anacostia Basin.

(2) Following the completion and commencement of operation of the Dickerson Plant, the flow share between Prince George's and Montgomery Counties to the Blue Plains Treatment Plant shall be on a equal basis. Numerically, this sharing will allocate 76.6± MGD of the 309 MGD Blue Plains capacity to each of the said counties.

(d) The storm water portion of the combined flows from the District of Columbia which are pumped to Blue Plains for treatment, (approximately 90% receiving secondary treatment) shall be deducted from the

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total District of Columbia flow, and shall not count in computation of the allotted flow of the District of Columbia. The storm water portion of these combined flows shall be calculated as shown on Appendix B, which is attached hereto and incorporated herein. When the 309 MGD advanced waste treatment process is completed at Blue Plains, there will be capacity to provide primary treatment and disinfection for an additional 289 MGD of combined flow over and above the combined flow referred to above. The District of Columbia agrees to vigorously pursue a program for the collection and treatment of all combined flows.

3. Control of Sewage Flows

All parties hereto agree that the following conditions shall be met:

(a) For each user jurisdiction, except the Washington Suburban Sanitary Commission, the sum of its "actual" flows plus all its "committed" flows shall at no time exceed its allotted flows as set forth in Appendix A. See Sample Calculation #1 in Appendix C, which is attached hereto and incorporated herein.

For the purposes of computations made pursuant to paragraph 3(a), "actual flows" means the highest rolling annual average flow recorded for any month during the twelve consecutive months ending with the month for which the computation is made.

For purposes of computations made pursuant to paragraph 3(a) "committed flows" means those flows which have received all required approvals to enter the sewerage system.

(b) Recognizing that it has present sewer service commitments outstanding under existing regulatory orders and procedures, the Washington Suburban Sanitary Commission agrees to comply with all the following requirements:

(1) The Commission shall defer, as necessary, the connections of the present outstanding commitments made to its sewerage system such that the requirements set forth in subparagraphs 3.(b)(2), 3.(b)(3) and 3.(b)(4) below are met at all times.

(2) During the period from the date of this Agreement until January 1, 1975, the Commission shall control the flows within, and the connections to, its sewerage system such that, for each month, the "actual" flows within its sewerage system (i.e., defined for this time period to mean the rolling annual average flow for the month for which the computation is made) shall not exceed the Commission's allotment for that month as set forth in Table 1 of Appendix A. (See Sample

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Calculation #2 in Appendix C.)

(3) During the period from January 1, 1975, until such time as the expanded secondary treatment process with full plant chemical addition is placed into operation at the Blue Plains Plant, the Commission shall control the flows within, and the connections to, its sewerage system such that, for each month, the "actual" flows within its sewerage system (i.e., defined for this time period to mean the highest rolling annual average flow recorded for any month within the twelve consecutive months which immediately precede the month for which the computation is made) plus the flows attributable to the connections made during the month for which the computation is made shall not exceed 144 MGD. (See Sample Calculation #3 in Appendix C.)

(4) After such time as the expanded secondary treatment process with full plant chemical addition is placed into operation at the Blue Plains Plant, the Commission shall control the sewer service commitments it makes, the flows within, and the connections to, its sewerage system such that, for each

month, the "actual" flows within its sewerage system (i.e., defined for this time period to mean the highest rolling annual average flow recorded for any month within the twelve consecutive months ending with the month for which the computation is made) plus the total flows attributable to all outstanding commitments to provide sewerage service where such flows will be treated at the Blue Plains Plant shall not exceed 153.294 MGD. (See Sample Calculation #4 in Appendix C.)

(c) If, for any reason, any user jurisdiction violates any condition or any requirement set forth above which is applicable to it, that user jurisdiction shall immediately stop making any further hook-ups, connections and extensions to its sewerage system. The sole exceptions to this ban shall be:

i. Elimination of an alternative method of sewage disposal which is certified to be a public health hazard by the chief officer of the State health agency or his designated local representative; this certification shall only be made on a parcel by parcel basis.

ii. Public service buildings, which includes schools, hospitals, nursing homes, medical and dental clinics, churches and synagogues, and structures used by public agencies in providing essential services for public health and welfare.

iii. Those buildings which have received sewer service commitments, and for which the footings had been poured and finally inspected as of the date that the ban on further hook-ups is imposed.

Such user jurisdiction agrees to make no further hook-ups, connections or extensions until three consecutive months have passed during which that user jurisdiction has complied, for each of those months, with all conditions and requirements set forth above applicable to it.

4. Flow Reporting

Each user jurisdiction agrees to submit to the District of Columbia each month a report which sets forth that user jurisdiction's actual flows, committed flows and total flows attributable to all actual connections made during that month. Such report shall contain a break down of total committed flows by sewer sheds and by calendar year during which such flows are expected to be connected

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to the system. Such report shall further set forth the total flows attributable to any connections and hook-ups made pursuant to the exceptions contained in 3.c. above. The District of Columbia shall consolidate each month the reports of all new jurisdictions and furnish copies of such consolidated report to each party hereto.

5. Flow Measuring and Monitoring

A committee will be established by E. P. A., the District, WSSC, Fairfax County, and other user jurisdictions, to develop a metering program which shall include, but not be limited to, maintenance, calibration, monitoring, replacement, location of additional meters, and reporting. The District of Columbia shall be the responsible party to install, replace, calibrate, record, and otherwise maintain all flow meters (35 at present) presently used to compute flows tributary to Blue Plains and those additional meters which may be installed for this purpose. Each user jurisdiction shall bear the actual cost, as billed by the District of Columbia, for the above services actually received by that user jurisdiction.

6. Reduction of Flows

The parties hereto agree to take action necessary to reduce and control flows in the collector and interceptor systems tributary to Blue Plains. Such action shall include, but not be limited to, the following:

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(a) Infiltration and Inflow Abatement - All user jurisdictions signatory hereto agree to expedite studies and to take all necessary corrective action as soon as possible to reduce infiltration and inflows into the system to within acceptable limits.

(b) Water Conservation Methods - All user jurisdictions signatory hereto agree, subject to existence of requisite legal authority, to adopt water conservation procedures in their respective jurisdictions similar in objective to those recommended by the Metropolitan Washington Council of Governments.

7. Correction of Raw Sewage Overflows

(a) The District and WSSC agree to the following schedule to stop all overflows in the Cabin John Basin. The existing valve on the relief sewer to the Maryland Potomac Interceptor has been fully opened and this flow is being metered by WSSC. A permanent connection (the size of which is to be determined within one month after the date of this Agreement by the District and WSSC) to the Potomac Interceptor (Dulles Interceptor) will be permitted by the District so long as it is metered and does not affect the flow allocation of other Potomac Interceptor users and flow through that connection shall be counted as part of the total WSSC allocation to Blue Plains. The permanent connection will be completed within 300 days after the necessary permits have been granted by the National Park Service.

(b) To relieve overflows of raw sewage into the Anacostia River, the WSSC and District of Columbia agree to expedite the construction of a sewer interceptor from Bladensburg to Blue Plains. The initial segments of such interceptor shall be constructed within fifteen months following the completion of all necessary administrative actions, with a temporary connection to an existing District of Columbia sewer at the Penn Central railroad crossing as stated in the Interim Chemical Agreement of October 18, 1971. EPA and the other parties to this Agreement agree to coordinate and cooperate, within their respective statutory powers, toward resolution of all applicable administrative actions required to expedite the construction of this interceptor. Such administrative actions include, but are not limited to, obtaining necessary rights-of-way, obtaining all necessary permits, and arrangement of the necessary financing.

(c) To mitigate the overflows at Bolling Field, the District agrees to maintain a sewage screen at the outlet of this overflow. Further reduction of wet weather overflows at this location will result when the new primary sedimentation tanks are placed in operation at Blue Plains.

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8. Sludge Management

The parties hereto recognize that the successful operation of the Blue Plains Plant necessitates the management and distribution of sludges, both digested and undigested, from the wastewater treatment process. The parties further recognize that during the past year Prince George's County has received most of the digested sludge from the Blue Plains Plant (184,000 tons). Additionally, Fairfax County has received the majority of the refuse (260,000 tons) from the District of Columbia. The parties also agree that the interim chemical addition program cannot be successfully implemented unless adequate sludge management capability is secured. In the spirit of regional cooperation, the parties hereto agree to manage and accept both the digested and undigested sludges in the following manner:

(a) Digested Sludge

(1) Digested sludge is produced at a rate of up to 310 tons per day (approximately 20% solids by weight). Digested sludge has agricultural value as a soil conditioner and fertilizer, and will be managed by such methods as land spreading and burial to the extent that the sludge cannot be made available for beneficial

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reuse through composting, thermal dehydration, or other acceptable methods. Within 10 days of the execution of this Agreement, Montgomery, Prince George's, and Fairfax Counties (the latter representing all Virginia flows during the interim period) agree to designate sites for the receipt of digested sludge on a proportionate basis in accordance with allocated flows to the Blue Plains Plant at the 309 MGD level, except as provided in paragraph 8(b)(4), which provides for an additional quantity of digested sludge to be allocated to Fairfax County.

(2) Except as provided in paragraph 8(b)(4), each of the above-mentioned Counties is required to receive its proportionate share of all digested sludge, by flows, and a proportionate share of the District of Columbia's proportionate share of the digested sludge, by flows, during the interim period. The receipt of the District of Columbia's proportionate share of the digested sludge by the suburban jurisdictions recognizes that the District of Columbia has exhausted all sites for land containment within its boundaries. It is intended that the distribution of digested sludge be rotated at least every 90 days, in the most efficient manner available to the District of Columbia. For accounting purposes, all sludge distributed to a county shall be credited to its proportionate share. The District of Columbia shall

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render quarterly reports to all parties on the distribution of digested sludge pursuant to this paragraph.

(b) Undigested Sludge

(1) Undigested sludge will be produced initially at a rate of approximately 400 tons per day (approximately 20% solids by weight) resulting from the addition of chemicals to the wastewater.

(2) Recognizing that the prime responsibility for the operation of the Blue Plains Plant rests with the District of Columbia, the State of Maryland, operating through the Maryland Environmental Service (MES), agrees to assist the District by providing for management and disposal of all undigested solids resulting directly from the interim chemical treatment of sewage at the Blue Plains Plant. The proposed method of undigested sludge management and disposal will include one or more of such methods as: thermal dehydration; composting; and land containment. The MES has programmed thermal dehydration facilities at Blue Plains with a nominal initial capacity of 240 tons per day of undigested sludge. Expansion of that system, as well as composting of undigested sludge, will depend upon testing currently underway by the U. S. Department of Agriculture, MES, and the District of Columbia, and upon

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testing of the thermal dehydration units at Blue Plains. A site or combination of sites for land containment is needed as a backup form of undigested sludge management, in case the thermal dehydration, composting or other alternative operations are not successful.

(3) The MES, in cooperation with Montgomery County and Prince George's County, will conduct the appropriate studies to select the necessary sites, and the transport routes thereto. The MES will prepare and release the final site selection report within a period of 50 days after the date of this Agreement. Montgomery County and Prince George's County each agree to select and approve a site or combination of sites, including the transportation routes thereto, within 50 days after the release of the MES report. The MES agrees to acquire the rights necessary to use said sites and to place into operation on said sites undigested sludge disposal and/or handling facilities within 50 days after said sites have been selected and approved.

(4) Begining 150 days after the date of this Agreement, and to the extent that thermal dehydration and/or composting have not been successful in

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disposing of all of the undigested sludge, Montgomery County, Prince Georges County, and Fairfax County will each receive its proportionate share of all undigested sludge, by flow allocation, and a proportionate share of the District of Columbia's sludge, by flow allocation, during the interim period, except that Fairfax County will receive its proportionate share of undigested sludge in the form of digested sludge. The Fairfax County share of undigested sludge will be accepted by Montgomery and Prince Georges Counties proportionally, by flow allocation, in addition to their own shares as defined above. In return, Fairfax County will accept, in addition to the amount of digested sludge specified as its share in Section 8(a)(2), an amount of digested sludge equal in quantity to the Fairfax County share of undigested sludge, as defined in this paragraph; this additional quantity of digested sludge will be subtracted from the proportional shares of Montgomery and Prince Georges Counties, as defined in paragraph 8(a)(2) on a proportional basis, by flow allocation. Accordingly, all of the undigested sludges shall be received and disposed of in Montgomery and Prince Georges Counties; and the amounts of digested sludges to be received by Montgomery and Prince Georges Counties in accordance with the terms of paragraph 8(a)(2) will be reduced proportionally by the receipt of additional digested sludges by Fairfax County. See Appendix D attached hereto and incorporated herein. In the event that the thermal dehydration or composting operations are successful and the resultant products are unmarketable, those products shall be distributed on the same basis. Operational decisions to achieve the proportionate sharing of undigested sludge will rest with the MES, which shall make quarterly reports thereon to each party hereto.

(5) All costs of sludge handling and disposal, and all costs attributable to the interim chemical program, including costs for acquisition of property rights necessitated pursuant to this Agreement, shall be borne by the user jurisdictions on the ratio of their respective monthly flows to the total of the monthly flows to the Plant. The District of Columbia shall be responsible for the collection and disbursement of all money required to implement the provisions of this paragraph.

(6) The user jurisdictions signatory hereto recognize the need to resolve the matter of recovery of costs and values of property acquired for sludge disposal, and, accordingly, agree to enter

negotiations and to resolve this issue by July 1, 1976.

(c) The District of Columbia, MES, and their agents and all persons, firms or corporations acting under, through or for them, by contract or otherwise, shall deliver and apply all undigested and digested sludge in accordance with formal procedures established by the respective receiving jurisdictions; provided, however, that such procedures shall not alter the distribution of sludges among the respective jurisdictions as set forth herein.

(d) The parties hereto recognize that a regional agreement is required prior to the commencement of operation of the advance wastewater treatment processes at the Blue Plains Plant in order to dispose adequately of the digested and undigested sludge which will be generated from the additional treatment processes at the Plant. It is anticipated that the installation and operation of all AWT treatment at the Blue Plains Plant will generate approximately 2,400 tons per day of sludge. The parties will agree, on or before July 1, 1976, on a permanent metropolitan-wide equitable disposal plan which will require the parties hereto to accept sludge, whether digested, undigested, or both, on a fair share basis to be effective as soon as possible after said Agreement is achieved, but no later than December 31, 1977.

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(e) In the event that there is any dispute as to the distribution of raw and/or digested sludges, or unmarketable products produced therefrom, among Montgomery, Prince George's and Fairfax Counties during the interim period, the algebraic expressions set forth in Appendix D shall control such distribution.

9. Conference Procedure

Technical representatives of all parties shall meet in the first week of January, April, July and October of each year to review the wastewater treatment programs within the Washington Metropolitan Area. The October meeting will include the principals of the parties hereto. The quarterly meetings shall be arranged by the Executive Director of the Metropolitan Washington Council of Governments. By written notice of at least 5 days, any of the parties hereto may call a special meeting if it feels conditions warrant immediate action. The user jurisdictions signatory hereto agree to meet, as provided above, before any future litigation concerning the subject matter of this Agreement is commenced by any user jurisdiction signatory hereto against any other party hereto. No meeting shall be required as a condition precedent to litigation if such a meeting cannot be held within 30 calendar days of the date on which the request for the meeting was made to all parties hereto.

10. As a signatory party to this Agreement, the Environmental Protection Agency in no respect waives its authority or obligations under the Federal Water Pollution Control Act, 33 U.S.C. § 1251, et seq., including its authority under Subsection 402(h) of that Act, or any other applicable Federal statute. This Agreement shall not affect nor alter the terms of any National Pollutant Discharge Elimination System Permit which may be issued for the discharge or discharges which are the subjects of this Agreement.

This Agreement shall become effective on , 1974.

WITNESS the following signatures of the parties by their duly-authorized agents.

DISTRICT OF COLUMBIA

By: ______________________________ Date: __________

______________________________ __________

WASHINGTON SUBURBAN SANITARY COMMISSION

By: ______________________________ Date: __________

______________________________ __________

MONTGOMERY COUNTY, MARYLAND

By: ______________________________ Date: __________

______________________________ __________

PRINCE GEORGE'S COUNTY, MARYLAND

By: ______________________________ Date: __________

______________________________ __________

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STATE OF MARYLAND

By: ______________________________ **Date:** __________

______________________________ __________

MARYLAND ENVIRONMENTAL SERVICES

By: ______________________________ **Date:** __________

______________________________ __________

FAIRFAX COUNTY, VIRGINIA

By: ______________________________ **Date:** __________

______________________________ __________

STATE WATER CONTROL BOARD, COMMONWEALTH OF VIRGINIA

By: ______________________________ **Date:** __________

______________________________ __________

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

By: ______________________________ **Date:** __________

______________________________ __________

APPENDIX A

ALLOCATION OF FLOWS

TABLE 1

	*D.C. Interim Allotment	*Virginia Interim Allotment	*Maryland Interim Allotment	*Total Interim Allotment
January 1, 1974	133.500	18.059	137.608	289.167
February 1, 1974	133.625	18.213	138.147	289.986
March 1, 1974	133.750	18.368	138.688	290.806
April 1, 1974	133.875	18.522	139.228	291.625
May 1, 1974	134.000	18.677	139.767	292.444
June 1, 1974	134.125	18.831	140.308	293.264
July 1, 1974	134.250	18.986	140.847	294.083
August 1, 1974	134.375	19.140	141.388	294.903
September 1, 1974	134.500	19.295	141.927	295.722
October 1, 1974	134.625	19.449	142.468	295.542
November 1, 1974	134.750	19.604	143.007	297.361
December 1, 1974	134.875	19.758	143.548	298.181
January 1, 1975**	135.000	19.913	144.087	299.000

NOTES

*Assuming successful interim treatment
**The detailed breakdown by user jurisdictions as of January 1, 1975 and until the expanded secondary treatment process with full plant chemical addition is in operation, is as follows:

USER JURISDICTION	FLOW ALLOCATION (MGD)
District of Columbia	135.000
WSSC	144.000
Fairfax County	15.580
Loudoun County Sanitation Authority	3.030
Town of Vienna	0.900
National Park Service (Great Falls)-Md.	0.007
National Park Service (Great Falls)-Va.	0.003
Naval Ship R & D Center (Md.)	0.080
Dulles Airport (FAA)	0.400

APPENDIX A

TABLE 2

After the date on which the expanded secondary treatment process with full plant chemical addition is placed in operation, the initial allocation of the total flow to the Blue Plains Plant (i.e., 309 MGD) among the users shall be as follows:[1]

USER JURISDICTION	FLOW ALLOCATION (MGD)
District of Columbia	135.000
WSSC	153.294[2]
Fairfax County	16.026
Loudoun County Sanitation Authority	3.208
Town of Vienna	0.953
National Park Service (Great Falls-Md. & Va.)	0.011
Naval Ship R&D Center (Md.)	0.085
Dulles Airport (FAA)	0.423
Total Capacity	309.000 MGD

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[1] This allocation shall be applicable until such time as a reallocation of the 309 MGD, pursuant to paragraph 5, 6, and 7 of the Memorandum of Understanding dated October, 1970, is agreed upon by the user jurisdictions.

[2] The 153.294 is to be divided between Montgomery and Prince George's Counties as set forth in paragraph 2c herein.

APPENDIX B

Typical Computation of the District of Columbia's Sanitary Flow using April 1973 Flows.

303.24 mgd - total flow including D.C. combined flow
-178.04 mgd - other jurisdictions sanitary flow
125.20 mgd - total D.C. flow including combined flow
- 15.97 mgd*- D.C. stormwater flow
109.23 mgd - D.C. sanitary flow

*D.C. Stormwater flow of 15.97 is computed as follows:

31.97 mgd monthly average volume receiving only primary treatment less 16.00 mgd which is the least amount of sewage receiving only primary on any given day of the month.

APPENDIX C

SAMPLE CALCULATIONS

Sample Calculation #1:

["actual flows," i.e., highest rolling annual average flow recorded for any month during the twelve consecutive months ending with the month for which the computation is made] plus ["committed flows," i.e., those flows which have received all required approvals to enter the sewerage system] shall not exceed "allotted flows" set forth in Appendix A.

Example: District of Columbia flows for March, 1974.

MONTH	ACTUAL FLOW FOR MONTH* (MGD)	ACTUAL ROLLING ANNUAL AVERAGE FLOW (MGD)	ACTUAL PEAK ROLLING ANNUAL AVERAGE FLOW (MGD)
May, 1972	122.35	*	
June, 1972	117.37	*	
July, 1972	147.58	*	
August, 1972	146.99	*	
September, 1972	133.56	*	
October, 1972	128.04	*	
November, 1972	122.71	*	
December, 1972	131.25	*	
January, 1973	109.02	*	
February, 1973	106.32	*	
March, 1973	115.55	* +	
April, 1973	105.67	127.94	127.94
May, 1973	104.75	126.20	
June, 1973	123.76	127.64	
July, 1973	129.46	125.52	
August, 1973	143.63	124.61	
September, 1973	144.58	124.81	
October, 1973	131.65	124.87	
November, 1973	130.46	125.04	
December, 1973	118.58	125.14	
January, 1974	121.85	125.43	
February, 1974	117.49	125.80	
March, 1974	126.39	126.10	

* Computed in accordance with Appendix B.

+ Arithmetic average of monthly flows for period May 1972 - April 1973 "actual flows" for March, 1974 = 127.94 MGD.

"committed flows" reported by the District of Columbia for March, 1974 = 1.5 MGD.

"allotted flows" for the District of Columbia for March, 1974 [from Table 1 of Appendix A] = 133.750 MGD.

"actual flows" + "committed flows" = 127.94 MGD + 1.5 MGD = 129.44 MGD, which is less than "allotted flows" of 133.750 MGD.

Sample Calculation #2:

["actual flows," i.e., rolling annual average flow for month of computation] shall not exceed ["allotted flows," i.e., flows permitted in Table 1 of Appendix A].

Example: WSSC flows for March, 1974.

MONTH	ACTUAL FLOW FOR MONTH (MGD)	ACTUAL ROLLING ANNUAL AVERAGE FLOW (MGD)
April, 1973	163.027	139.59
May, 1973	150.577	140.14
June, 1973	143.670	140.34
July, 1973	131.084	140.54
August, 1973	123.270	140.72
September, 1973	120.460	140.13
October, 1973	116.810	139.47
November, 1973	110.030	137.26
December, 1973	123.800	135.21
January, 1974	132.850	134.43
February, 1974	125.430	132.41
March, 1974	123.910	130.41

"actual flows" for March, 1974 = 130.41 MGD.

"allotted flows" for March, 1974 = 138.601 MGD.

[138.601 MGD is the WSSC's share of the Maryland interim allotment from Table 1 of Appendix A for March, 1974.

Maryland interim allotment - March, 1974		138.688
National Park Service - Maryland	0.007	
Naval Ship R & D Center - Maryland	0.080	
		0.087
		138.601

Sample Calculation #3:

["actual flows," i.e., highest rolling annual average flow recorded for any month within the twelve consecutive months which immediately precede the month for which the computation is made) plus [flows attributable to connections made during the month for which the computation is made] shall not exceed 144 MGD.

Example: WSSC flows for February, 1975.

MONTH	ACTUAL FLOW FOR MONTH (MGD)	ACTUAL ROLLING ANNUAL AVERAGE FLOW (MGD)	ACTUAL PEAK ROLLING ANNUAL AVERAGE FLOW (MGD)
March, 1973	148.327		
April, 1973	163.027		
May, 1973	150.577		
June, 1973	143.670		
July, 1973	131.084		
August, 1973	123.270		
September, 1973	120.460		
October, 1973	116.810		
November, 1973	110.030		
December, 1973	123.800		
January, 1974	132.850		
February, 1974	125.430	132.41	132.41
March, 1974	123.910	130.41	
April, 1974	124.000*	127.24	
May, 1974	125.000*	125.11	
June, 1974	126.000*	123.64	
July, 1974	127.000*	123.21	
August, 1974	128.000*	123.61	
September, 1974	129.000*	124.32	
October, 1974	130.000*	125.42	
November, 1974	131.000*	127.16	
December, 1974	132.000*	127.85	
January, 1975	133.000*	127.86	

* hypothetical flows

"actual flows" (based on above table) for February, 1975 = 132.41 MGD

"committed flows" (hypothetically) connections made in February, 1975 = 2.00 MGD

"actual flows" + "committed flows" = 134.41 MGD

Sample Calculation #4:

["actual flows," i.e., highest rolling annual average flow recorded for any month during the twelve consecutive months ending with the month for which the computation is made] plus ["committed flows," i.e., total flows attributable to all outstanding commitments to provide sewerage service where such flows will be treated at Blue Plains] shall not exceed 153.294 MGD.

"Actual flows" computed in same manner as done in Sample Calculation #3.

APPENDIX D

SLUDGE

Sludge shall be distributed during the interim period among Montgomery, Prince George's and Fairfax Counties for disposal as follows:

JURISDICTION	AMOUNT (tons/day)		
	DIGESTED		RAW
Montgomery County	$[(0.476x)-(0.539)(0.118y)]$	+	$(0.539y)$
Prince George's County	$[(0.406x)-(0.461)(0.118y)]$	+	$(0.461y)$
Fairfax County	$[(0.118)(x+y)]$	+	- 0 -

where:

x = amount (in tons/day) of digested sludge, or unmarketable products produced therefrom, which must be contained or spread upon land for disposal.

y = amount (in tons/day) of undigested sludge, or unmarketable products produced therefrom, which must be contained or spread upon land for disposal.

* Note: (1) Coefficients used in the algebraic expressions above are based upon flow allocations in the 309 MGD Blue Plains Plant, with adjustments made by paragraph 8.

(2) This Agreement may be amended to the extent required to change the above coefficients in order to reflect any future reallocation of the WSSC's flows between Montgomery and Prince George's Counties.

example:
for $x = 310$ tons/day
$y = 400$ tons/day

JURISDICTION	AMOUNT (tons/day)	
	DIGESTED	RAW
Montgomery County	121.6	216
Prince George's County	104.2	184
Fairfax County	84.2	0
Total	310.0	400

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APPENDIX H

SUMMARY AND CONCLUSIONS OF TECHNICAL REPORT #35, WATER RESOURCES - WATER SUPPLY STUDY OF THE POTOMAC ESTUARY

SUMMARY AND CONCLUSIONS
FROM
A WATER RESOURCE-WATER SUPPLY STUDY
OF THE
POTOMAC RIVER ESTUARY

Prepared for the Progress Meeting of April 29, 1971

of the

Potomac Metropolitan Area Enforcement Conference

Chesapeake Technical Support Laboratory
Water Quality Office, Environmental Protection Agency

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CHAPTER II

SUMMARY AND CONCLUSIONS

A detailed study of the interrelationships among wastewater discharges, water supply withdrawals, freshwater inflow, and water quality in the Potomac Estuary was undertaken in November 1969. This study had two purposes: (1) to refine the allowable oxygen demanding and nutrient loadings previously established for Zones I, II, and III of the upper Potomac Estuary and (2) to determine the feasibility of using the estuary as a municipal water supply source. The latter study was conducted in cooperation with the U.S. Army Corps of Engineers. The study findings as related to wastewater management are presented below:

1. The Potomac River Basin has a drainage area of 14,670 square miles. The average discharge rate of the Potomac River at Great Falls is 10,780 cubic feet per second (cfs) with a minimum of 610 cfs and a maximum of over 484,000 cfs.

2. Of the present 3.3 million population in the Potomac River Basin, 2.8 million live within the study area which encompasses the entire Washington metropolitan region.

3. The present municipal water use within the study area is 370 mgd with 72 percent (265 mgd) supplied from the Potomac River above Washington. The industrial water use is 2,750 mgd with cooling water for electric power production accounting for 99 percent.

4. Recreational facilities on or near the Potomac Estuary include a national park, three state parks, seven fish and game areas and 226 county recreational sites. A recent study by the Bureau of Outdoor Recreation indicated that the recreational potential of the 637 miles of shoreline has barely been developed.

5. In 1969, approximately 17-million pounds of fish, crabs, clams, and oysters were taken from the Potomac tidal system with a dockside value of some $4.7 million. A study in 1961 indicated that about $0.6 million was spent during six months of sport fishing in the Potomac Estuary. There are approximately 95 marina facilities in the tidal Potomac which accommodate over 5,200 recreational watercraft.

6. Effluents from the 18 major wastewater treatment facilities and combined sewer overflows, with a total flow of 325 mgd, contribute

450,000, 24,000, and 60,000 lbs/day of ultimate oxygen demand (UOD*), phosphorus, and nitrogen respectively to the waters of the upper Potomac Estuary.

7. Under low-flow conditions, the ultimate oxygen demand, phosphorus, and nitrogen loadings from the upper basin and local runoff were estimated as 66,000, 1,000, and 2,300 lbs/day, respectively.

8. The major sources of nutrients and ultimate oxygen demand in the Potomac Estuary are the local wastewater discharges, Under low-flow conditions approximately 88, 90 and 96 percent of the ultimate oxygen demand, nitrogen, and phosphorus are from treated waste effluents. At median freshwater inflows, approximately 62, 60, and 82 percent respectively are from these wastewater discharges.

9. Since the first sanitary surveys in 1913, the water quality of the upper Potomac Estuary has generally deteriorated. This is attributable to the increased pollution originating in the Washington area.

10. Fecal coliform densities have recently proved an exception to the general degradation as shown by the water quality indicators. Since the summer of 1969, the high fecal coliform densities previously found near the waste discharge points have been significantly reduced by continuous wastewater effluent chlorination. At present, the largest sources of bacterial pollution in the upper estuary are from sanitary and combined sewer overflows, where at times about 10 to 20 mgd of untreated sewage enters the estuary because of inadequate sewer and treatment capacities.

To achieve the adopted fecal coliform water quality standards, there must be both continuous disinfection of wastewater effluents and elimination of drastic reduction in overflows from sanitary and combined sewers.

11. The most pronounce effect of thermal discharges is in the Anacostia tidal river where a five-degree rise above ambient 91.4°F water temperature frequently occurs and readings as high as 33°C have been recorded during the summer months.

12. Since 1938, dissolved oxygen levels in the upper estuary had been decreasing. A slight upward trend occurred in the

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*UOD - Ultimate Oxygen Demand is defined as the sum of 1.45 times the 5-day biochemical oxygen demand and 4.57 times the unoxidized nitrogen.

early 1960's due to the provision of a higher degree of wastewater treatment. However, with increasing population, the amount of organic matter discharged has increased to a record high in 1970 resulting in a critical dissolved oxygen stress in the receiving water. In recent years, dissolved oxygen concentrations of less than 1.0 mg/l have occurred during low-flow, high-temperature periods.

13. Mathematical model simulation of the dissolved oxygen budget including carbonaceous, nitrogenous, benthic, and algal demands indicate that the nitrogenous demand is the greatest cause of dissolved oxygen deficit in the critical reach near the wastewater discharges and that algal growths have the greatest effect on DO from Piscataway to Indian Head, at times depressing it below 5.0 mg/l.

14. On the average, approximately 3-billion pounds per year of sediments enter the Potomac Estuary of which 2.2-billion pounds per year originate in the upper Potomac River Basin. The sediment yield from the Washington area on a lbs/sq mi/yr basis is about seven times greater than that from the upper basin.

15. Since 1913, the wastewater discharge quantities have increased sevenfold from 42 to 325 mgd, the phosphorus load increased 22-fold from 1,100 to 24,000 lbs/day; nitrogen ninefold, from 6,400 to 60,000 lbs/day; and carbon approximately twofold, from 40,000 to 100,000 lbs/day. When ecological plant successions from a balanced toward an unbalanced system (primarily one dominated by blue-green algae) are related to wastewater loading trends, it can be concluded that the ecological successions are the result of increases in nutrients. Moreover, it appears that the ecological changes are due primarily to the large increases in phosphorus and nitrogen.

16. In recent years, large populations of blue-green algae, often forming thick mats, have been observed in the Potomac Estuary from the Potomac River Bridge (Route 301) to the Woodrow Wilson Bridge during the months of June through October. In September of 1970, after a period of low-stream flow and high temperatures, the algal mats extended upstream beyond Haines Point and included the first nuisance growth within the Tidal Basin. The effects of the massive blue-green algal blooms in the middle and upper portions of the Potomac Estuary are (1) large increases of over 490,000 lbs/day in total oxygen demand, (2) an overall decrease in dissolved oxygen due to algal respiration in waters 12 feet and greater in depth, (3) creation of nuisance and aesthetically objectionable conditions, and (4) reduction in the feasibility of using the upper estuary as a potable water supply source because

of potential toxin, taste, and odor problems.

17. To reduce the effects of excessive algal blooms on water quality and designated beneficial uses, it has been determined that during the summer months, the standing crop should be reduced to a minimum of 75 to 90 percent of the current level or to a chlorophyll a concentration at or below 25 ug/l.

18. From six independent methods of analysis, it appears that if the upper concentration limit of inorganic nitrogen is maintained between 0.3 and 0.5 mg/l as N and the upper limit of total phosphorus at 0.03 to 0.1 mg/l as P, the algal standing crop can be maintained below nuisance levels under summer conditions. The lower limits of nutrient concentration apply to the embayments and middle portion of the estuary where growing conditions are more favorable, whereas the higher concentrations are applicable to the upper portion of the estuary where lack of light penetration limits algal growth.

19. Significant accumulations of various heavy metals in sediments have been detected near the major wastewater discharges. A study of the possible long-term toxic effects of these heavy metals on the biota of the Potomac Estuary, especially shellfish, is essential.

20. Population and water supply needs have been projected as follows:

		Water Supply Needs		
Year	Population	Yearly Avg. (mgd)	Maximum Month (mgd)	Maximum Daily (mgd)
1969	2,700,000	370	470	660
1980	4,000,000	570	720	1000
2000	6,700,000	1010	1310	1820
2020	9,300,000	1570	2040	2820

21. Even with the seven proposed upper Potomac River Basin reservoirs operational, the following withdrawals will be required from the estuary or from direct wastewater reuse to meet the water supply requirements:

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Low-Flow Characteristics Before Water Supply Diversion		Withdrawal from the Potomac Estuary or from Direct Reuse*		
Recurrence Interval (years)	Minimum Monthly Fresh Inflow (mgd)	1980 For a 720 mgd Need (mgd)	2000 For a 1310 mgd Need (mgd)	2020 For a 2040 mgd Need (mgd)
5	1300	none	210	940
20	1170	none	340	1070
50	910	none	600	1330

*Withdrawal based on minimum 30-day low flow concurrently with a maximum 30-day water supply withdrawal and a 200 mgd minimum base flow over Great Falls into the estuary.

22. The projected wastewater volumes and loading characteristics before treatment are as follows:

Year	Flow (mgd)	BOD (lbs/day)	Nitrogen (lbs/day)	Phosphorus (lbs/day)
1969	325	483,500	63,500	27,300
1980	475	823,500	95,600	43,100
2000	860	1,463,500	155,700	70,300
2020	1,340	2,195,000	215,600	97,400

23. To aid in determining the allowable pollutant loadings from wastewater discharges, mathematical models have been developed and verified for predicting (1) phosphorus transport, (s) nitrogen transport and assimilation, (3) effects of benthic, carbonaceous, and nitrogenous oxygen demand, including the effects of algal photosynthesis and respiration on the dissolved oxygen budget, and (4) chloride and total dissolved solids intrusions from the Chesapeake Bay, and their buildup as a result of water supply withdrawals from the estuary.

24. Based upon the study of projected wastewater quantities and the recently adopted metropolitan Washington wastewater treatment implementation schedule, the following can be concluded:

(1) Between the years 1980 and 2000, the Potomac (Dulles) Interceptor, with its current capacity of 65 mgd, will be overloaded.

(2) To provide for future wastewater collection and treatment facilities in areas currently projected to be served by the Potomac Interceptor, either the capacity of the interceptor would have to be significantly increased or additional wastewater treatment facilities constructed on the Potomac River above Washington.

(3) With the Blue Plains wastewater treatment capacity limited to 309 mgd, a need exists not only for one or more facilities to serve the Anacostia Valley, but also to serve a portion of the upper Potomac area currently served by Blue Plains via the Dulles Interceptor.

(4) Large wastewater volumes are projected in the Occoquan and Pohick watersheds in the Virginia counties downstream from Washington, indicating a need for long-range water resources planning in the area.

25. Three basic alternative wastewater treatment systems were investigated to determine the effects of the discharge locations on receiving water quality including chloride and total dissolved solid intrusions, as follows:

(1) Alternative I consisted of the following plants: Pentagon, Arlington, Blue Plains, Alexandria, Piscataway (also serving Andrews Air Force Base), Lower Potomac (serving Pohick, Accotink, Dogue, and Little Hunting Creek watersheds, including Fort Belvoir), Mattawoman, Neabsco (serving the Occoquan watershed), and Port Tobacco.

(2) Alternative II consisted of the nine treatment plants as in Alternative I, plus a facility serving the Anacostia Valley and located just above the Maryland-D.C. Line, and

(3) Alternative III consisted of the same facilities as Alternative II, plus an upper Potomac plant discharging near Chain Bridge and serving the upper Potomac region.

Two other systems designated as Alternatives IV and V were also investigated. These were identical to III, except that for Alternative IV, all effluents were assumed to be discharged into the main channel of the Potomac; while for Alternative V, all effluents were assumed to be conveyed downstream to a common discharge point below Indian Head, Maryland.

26. Data from the chloride, total dissolved solids, and other simulations where the estuary was used as a potable water supply source indicate the following:

(1) The position of the salt wedge with respect to intrusion from the Chesapeake Bay is a function of (a) duration and magnitude of any selected flow, (b) location of the wastewater treatment facility discharges, and (c) consumptive losses in the water distribution system.

(2) Even with no water supply withdrawals from the estuary, for comparable flow conditions, intrusion of chlorides and total dissolved solids from the Chesapeake Bay will occur farther upstream in the future as a result of the greater percentages of wastewater discharged downstream into the salt wedge and the projected increases in consumptive loss, with the latter having the most pronounced effect.

(3) The number of days during which the estuary can be used for water supply depends upon (a) the position of the wedge prior to the withdrawal, (b) magnitude of the withdrawal, (c) freshwater inflow during withdrawal, (d) location of the wastewater discharges, and (e) the increase in chlorides and total dissolved solids as a result of water use.

(4) The maximum possible number of days that the estuary could be used for a water supply source was determined by using a total dissolved solids concentration in the blended water of 500 mg/l maximum as a criterion since this parameter was determined to be more critical than chlorides. TDS water use increments* of 40 and 240 mg/l were applied at both the upstream and downstream location extremes of the saltwater wedge to give the results in the table below:

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*Water use increment is the amount that the concentration of TDS or any other parameter is increased from the point of water intake to the point of discharge as a result of water supply treatment, municipal use, and wastewater treatment.

Alternative I

Maximum Days of Use of Estuary

Year	Water Withdrawal from Estuary (cfs)	Upper Position of Wedge Water Use Increment		Lower Position of Wedge Water Use Increment	
		40 mg/l	240 mg/l	40 mg/l	240 mg/l
1980	500	166	166	166	166
2000	1250	90	35	140	45
2020	2000	45	15	95	20

(5) For the year 2020 and using the upper position of the wedge (as observed in early September 1966-- the lowest flow on record), the number of days that the estuary can be used as a water supply and yet maintain a maximum 500 mg/l total dissolved solids standard in the blended water is given below as a function of freshwater flow before water supply diversions:

Maximum Days of Use of Estuary

Freshwater Flow (cfs)	Alternative I Water Use Increment		Alternative V Water Use Increment	
	40 mg/l (days)	240 mg/l (days)	40 mg/l (days)	240 mg/l (days)
400	45	15	18	18
1100	166	42	166	41
1800	166	166	166	166

(6) Since the projected water supply needs for the year 2020 cannot be met completely either by withdrawals from the estuary or from the seven proposed upper basin reservoirs for drought periods extending over a month, both sources will eventually be needed to meet the future water requirements for the Washington metropolitan area. It appears that an increase of approximately 860 cfs (from 940 to 1800 cfs) in the Potomac River discharge at Washington will be required to maintain an acceptable blended water with respect to total dissolved solids

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for a 240 mg/l water reuse increase. If the increase is less than 240 mg/l, the flow regulation requirements will decrease.

(7) While other aspects of water supply requirements such as viruses and carbon chloriform extractables need to be considered in more detail, it appears that the estuary can be used as a supplementary water supply source if wastewater discharges and water supply withdrawals are subjected to adequate treatment.

27. Direct reuse of the renovated wastewater is another solution to meet water supply needs. This alternative has numerous advantages over withdrawals from the estuary because:

(1) Any need for consideration of salt intrusion from the Chesapeake Bay for water supply purposes is eliminated,

(2) Localized runoff and combined sewer overflows will not degrade the high quality renovated water,

(3) The need for flow regulation from upstream reservoirs to meet the projected Washington area water supply requirements is reduced to a total flow of approximately 1100 cfs (before water supply diversion) or an increase of about 150 cfs above unregulated conditions.

Excluding the psychological objections to treated wastewater reuse and the problems of physical transport of the wastewater to the water intake, the major disadvantage, expecially from the technical viewpoint, would be the need to maintain the present maximum total dissolved solids buildup of 140 mg/l through the water supply treatment, water use, and wastewater renovation processes whenever more than 80 percent of the water supply is taken directly from renovated wastewater.

28. When the water resource needs of the entire basin are considered, the long-range solution to the water supply-wastewater disposal problem may initially be a combination of water supply withdrawals from the estuary and flow regulation, with direct reuse becoming increasingly feasible by early in the 21st Century.

29. The maximum allowable ultimate oxygen demand loadings have been determined as given below for various zones and subzones of the upper estuary for a 29°C temperature, a freshwater inflow after water supply diversion of 300 cfs, a DO of 6 mg/l in the treated effluent, and based upon maintaining 5 mg/l DO

in the receiving waters.

MAXIMUM UOD LOADINGS FOR POTOMAC ESTUARY

Zone		Allowable UOD* (lbs/day)
I-a	(Upstream from Haines Point)	4,000
I-b	(Anacostia River)	3,000
I-c	(Haines Point to Broad Creek)	75,000
II	(Broad Creek to Indian Head)	190,000
III	(Indian Head to Smith Point)	380,000

*These loadings are the maximum allowable loadings for each zone assuming adjacent zones are loaded to their maximum capacities.

30. For the three freshwater inflows (before water supply withdrawal) investigated, i.e., 1800, 1100, and 400 cfs, the maximum UOD loadings were not affected significantly, except for Alternative III which included a treated waste discharge in Zone I-a near Chain Bridge.

When the DO in the effluents in mathematical model simulations was decreased from 6.0 to 2.0 mg/l, the most pronounced effect was in Zone I-c in which the UOD loading decreased from 75,000 to 56,000 lbs/day.

31. Allowable UOD loadings for the Piscataway and Gunston Cove embayments have been developed for the projected wastewater volumes and conditions specified in Number 29 and are given below:

MAXIMUM UOD LOADINGS FOR PISCATAWAY CREEK AND GUNSTON COVE

Piscataway Creek		Gunston Cove	
Wastewater Flow (mgd)	Maximum UOD Load (lbs/day)	Wastewater Flow (mgd)	Maximum UOD Load (lbs/day)
24	10,000	50	7,000
49	11,000	103	11,000
79	12,000	170	16,000

32. Since nitrification (the conversion of ammonia nitrogen to nitrate nitrogen) has little effect on the oxygen resources of the estuary at temperatures below 15°C, nitrogen removal from the wastewater effluents to meet DO standards will be required whenever the water temperature is above 15°C, usually during the months of April through October.

In order to prevent formation of sludge deposits, to eliminate objectionable floating matter, and to prevent low DO concentrations during periods of ice cover, a minimum of 70 percent UPD removal and an effluent concentration of less than 15 mg/l suspended solids are required year-around for all discharges.

33. Using an average freshwater inflow of 300 cfs to the Potomac Estuary after water supply diversions, the allowable loadings of phosphorus by zones were determined based on maintaining an average maximum of 0.067 mg/l as P in Zones I and II, and 0.03 mg/l as P in Zone III for algal control. The allowable loadings are presented below:

MAXIMUM PHOSPHORUS LOADINGS FOR POTOMAC ESTUARY

Zone	Allowable Phosphorus (lbs/day)
I-a (Upstream from Haines Point)	200
I-b (Anacostia River)	85
I-c (Haines Point to Broad Creek)	900
II (Broad Creek to Indian Head)	1500
III (Indian Head to Smith Point)	2000

34. Allowable phosphorus loadings for the Piscataway and Gunston Cove embayments for phosphorus concentration in the receiving waters of 0.03 mg/l as P are shown below as a function of wastewater flow:

PHOSPHORUS LOADINGS TO EMBAYMENTS

Piscataway Creek		Gunston Cove	
Wastewater Flow (mgd)	Maximum Phosphorus Load (lbs/day)	Wastewater Flow (mgd)	Maximum Phosphorus Load (lbs/day)
24	35	50	35
49	50	103	60
79	65	170	140

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35. To prevent excessive algal growth and to enhance the water quality in the upper and middle reaches of the estuary, it appears that it will be necessary to remove phosphorus on a continuous or a year-around basis for discharges into the upper estuary. Moreover, the control of at least 50 percent of the phosphorus load originating in the upper Potomac River Basin appears necessary if the aforementioned phosphorus criteria are to be achieved. To accomplish this reduction, the current phosphorus loading from all wastewater discharges in the upper Potomac River Basin must be decreased from 6100 to 700 lbs/day.

36. Using a freshwater inflow of 300 cfs and average maximum inorganic nitrogen concentrations of 0.5, 0.4, and 0.3 mg/l in Zones I, II, and III, respectively, for algal control, the maximum nitrogen loadings for warm temperature conditions were determined as follows:

NITROGEN LOADINGS FOR POTOMAC ESTUARY

Zone		Allowable Total Nitrogen (lbs/day)
I-a	(Upstream from Haines Point)	1000
I-b	(Anacostia River)	300
I-c	(Haines Point to Broad Creek)	3400
II	(Broad Creek to Indian Head)	5800
III	(Indian Head to Smith Point)	9000

37. Allowable total nitrogen loadings for the Piscataway and Gunston Cove embayments based upon maintaining 0.3 mg/l of inorganic nitrogen under warm temperature conditions and for varying wastewater flows follow:

NITROGEN LOADINGS TO EMBAYMENTS

Piscataway Creek		Gunston Cove	
Wastewater Flow (mgd)	Maximum Nitrogen Load (lbs/day)	Wastewater Flow (mgd)	Maximum Nitrogen Load (lbs/day)
24	120	50	130
49	170	103	270
79	270	170	460

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38. Considering the present difficulty in controlling nitrogen in the upper basin and its transport characteristics in the estuary, it appears that the need for nitrogen removal for algal control at wastewater treatment plants will be limited to those periods when the water temperature exceeds 15°C, normally from April through October. With the large projected increases in nitrogen from wastewater discharges, there may be a need for year-around nitrogen control by the year 2000.

39. Because of the lack of transport and assimilative capacity in the upper portions of small tidal embayments and also because of ideal algal growing conditions, maximum concentrations of UOD, phosphorus and nitrogen in effluents discharged to these areas should be less than 10.0, 0.2, and 1.0 mg/l, respectively. A detailed analysis for each embayment is required to determine the minimum cost of either extending the discharge outfall to the main channel of the Potomac or discharging within the embayment and providing a very high degree of wastewater treatment, approaching ultimate wastewater removation. Unless this high degree of removal is provided, effluents from Alexandria, Arlington, Piscataway, and the Lower Potomac facilities should be discharged into the main channel of the Potomac Estuary.

40. The present worth cost of additional wastewater treatment from the 1970 to 2020, including operation, maintenance, and amortization costs, has been estimated to be $1.34 billion with a total average annual cost of $64.8 million. The unit treatment processes assumed include activated sludge, biological nitrification-denitrification, lime clarification, filtration, effluent aeration, and chlorination.

41. The cost of wastewater treatment on a per capita basis is as follows:

Item	1970-1980	1980-2000	2000-2020
Average Population	3,350,000	5,350,000	8,000,000
Initial Capital Cost/Person/Year	$17.0	$ 4.90	$ 7.30
Operation and Maintenance Cost/Person/Year	$ 7.50	$ 8.60	$ 9.10
Total Cost/Person/Year	$24.50	$13.50	$16.40

APPENDIX I

EXISTING AND PROPOSED WASTEWATER DISCHARGES IN THE WASHINGTON, D. C. SMSA

TABLE I 1

DOMESTIC

MARYLAND

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Blue Plains STP (1)	Washington, D.C.	Potomac River	240.0	281.0	Secondary	Upgrading and facilities to 309 MGD.
Benedict STP	Charles County	Patuxent River	-	-	-	Planned facility
Gallent Green STP	Charles County	Swanson Cr.(Patuxent)	0.060	-	Secondary	Under Construction
Mattawomen Creek STP (CCSD)	Charles County	Potomac River	5.0	-	Secondary	Planned facility
Clifton on the Potomac	Charles County	Potomac River	0.035	-	Secondary	Under Construction
Strawberry Hills Estate	Charles County	Pomonkey Creek	0.100	0.050	Secondary	-
Waldorf STP (CCSD)	Charles County	Mattawoman Cr.	0.250	0.200	Secondary	To connect to other system
Port Tobacco STP (CCSD)	Charles County	Port Tobacco River	-	-	Secondary	Planned
Lackey High School (CCSD)	Charles County	Trib-Mattawoman Creek	0.028	0.010	Secondary	-
J.C. Parks Elementary School (CCSD)	Charles County	Trib-Mattawoman Creek	0.073	0.003	Secondary	-
Community College (CCSD)	Charles County	Port Tobacco Creek	0.060	0.020	Secondary	-

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TABLE I 1 (con't.)

DOMESTIC

MARYLAND

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Gail Bailey Elementary School (CCSD)	Charles County	Trib-Mattawoman Creek	0.015	0.005	Secondary	-
Saint Charles City	Charles County	Ground	0.250	0.230	Secondary	To upgrade and enlarge facility
Potomac Heights	Charles County	Potomac River	0.400	0.200	Primary	-
North Indian Head Estates	Charles County	Pomonkey River	0.160	0.075	Secondary	-
Morgantown PEPCO	Charles County	Potomac River	0.010	0.003	Secondary	-
Marshall Hall Amusement Park	Charles County	Potomac River	-	-	Secondary	-
La Plata	Charles County	Trib of Port TobaccoCr	0.300	0.300	Secondary	--
Indian Head WWTP	Charles County	Mattawoman Creek	0.300	0.280	Secondary	-
Southern Maryland Correctional Ctr.	Hughesville, Charles County	Gilbert Run	0.010	-	Secondary	-
Hughesville	Charles County	Gilbert Run	-	-	None	-
Faulkner AT&T	Charles County	Trib of Potomac River	0.010	.003	Secondary	-
Thunderbird Motel	Faulkner,	Trib of Potomac River	0.003	-	Secondary	-
Cobb Island	Charles County	Potomac River	-	-	Secondary	Planned facility
Thunderbird Motel	Bel Alton, Charles County	Willis Branch	0.005	0.005	Secondary	--

TABLE I 1 (con't.)

DOMESTIC

MARYLAND

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Bel Alton School	Charles County	Trib to Potomac River	0.015	-	Secondary	-
Waldorf Motor Court	Charles County	Mattawoman Creek	-	-	Secondary	-
Mount Carmel Woods	Charles County	Jennie Run	0.020	0.005	Secondary	-
Idlewood Travler Court	Charles County	Zekiah Run	-	0.002	Secondary	To connect to another facility
Elementry School	Burtonsville Montgomery Co.	Trib to Patuxent	0.006	-	Secondary	-
Comsat Lab (285)	Clarksburg Montgomery Co.	Ground	-	0.027	Secondary	-
Dickerson PEPCO (153)	Montgomery County	Potomac River	0.010	0.007	Secondary	-
Seneca Day Camp (251)	Montgomery Co.	Little Seneca Creek	-	0.001	Secondary	-
River Road County Club (290)	Montgomery Co.	Ground	0.010	0.004	Secondary	-
Poolesville (108)	Montgomery Co.	Dry Sened Creek	0.200	0.100	Secondary	-
Boyds Elementary School (417)	Montgomery Co.	Little Seneca Creek	-	0.004	Secondary	-
Boyds	Montgomery Co.	Trib to Seneca Creek	-	-	Secondary	Planned facility
Damascus STP (WSSC) (335)	Montgomery Co.	Magruder Branch	0.025	-	Secondary	Under Construction

TABLE I 1 (con't.)

DOMESTIC

MARYLAND

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
IMF-Brentwood	Montgomery County	Irrigation	0.01	-	Tertiary	-
Montgomery Valley Country Club	Montgomery Co.	Cabin Branch	0.05	-	-	Under Const.
Brook Manor Country Club	Montgomery County	North Branch	0.005	-	-	-
Norbeck	Montgomery County	North Branch	0.005	-	-	-

TABLE I 1 (con't.)

DOMESTIC

MARYLAND

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Belair Bowie WTP	Prince George Co.	Patuxent River	3.500	2.250	Secondary	Upgrading facility
Horsepen Branch STP (WSSC)	Prince George Co.	Horsepen Branch (Patuxent)	1.250	-	Tertiary	Planned facility
Marlton STP (WSSC)	Prince George Co.	Charles Branch (Patuxent)	0.300	0.150	Secondary	Upgrade to Terteriy
Western Branch STP(WSSC)	Prince George Co.	Western Branch (Patuxent)	5.000	5.000	Secondary	Planning Nutrient Removal
Parkway STP (WSSC)	Prince George Co.	Patuxent River	4.500	4.500	Secondary	To Enlarge faciliy
Bowie Race Track	Prince George Co.	Horspen Brook (Putuxent)	0.105	-	Secondary	-
Bowie State Col.	Prince George Co.	Patuxent River	0.080	0.040	Secondary	To connect to another facilty
Andrews Field Motel	Camp Springs Prince George Co.	Cabin Branch (Patuxent)	-	-	Secondary	" " "
Chalk Point PEPCO	Prince George Co.	Patuxent River	0.010	0.008	Secondary	-
Marlboro Meadows	Prince George Co.	Patuxent River	0.600	0.100	Secondary	-
Landover Mall (330)	Prince George Co.	Beanordam Creek	0.200	0.062	Secondary	-
Point Ridge Lagoon	Collington Prince George Co.	Collington Branch (Patuxent)	0.480	0.480	Secondary	-
Boys Village (116)	Cheltenham Prince George Co.	Piscataway Creek	0.180	0.126	Secondary	-

TABLE I 1 (con't.)

DOMESTIC

MARYLAND

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Burroughs Jr. High School (295)	Piscataway Prince George Co.	Trib to Piscataway Creek	0.030	0.021	Secondary	-
Brandy Wine Elem. School	Prince George Co.	Timothy Branch	0.010	-	Secondary	-
Piscataway STP (WSSC) (185)	Prince George Co.	Piscataway	15.000	11.000	Secondary	Upgrading and enlarging facility

DOMESTIC

VIRGINIA

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Dogue Creek Plt (7)	Fairfax County	Dogue Creek	3.084	2.770	Secondary	To connect to another facility
Field Unit #30 Virginia	Fairfax County	Little Rocky Run	0.120	0.020	Secondary	Needs disenfection
Little Hunting Creek (6)	Fairfax County	Little Hunting Creek	3.648	4.459	Secondary	To connect to another facility
Westgate Plant (5)	Fairfax County	Potomac River	13,700	10.330	Secondary	To connect to another facility
Loisdale Utilities	Fairfax County	Long Branch	0.106	0.100	Secondary	To connect to another facility

TABLE I 1 (con't.)

DOMESTIC

VIRGINIA

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Lower Potomac STP (5)	Fairfax County	Polick Creek	18.000	11.390	Secondary	To enlarge & upgrade facility
Lorton Reformatory	Fairfax County	Trib of Occ Oquan River	0.750	0.554	Secondary	–
Herdon	Fairfax County	Follylich Branch	0.300	0.427	Secondary	To connect to another facility
Gunston Elementary School	Lorton, Fairfax County	South Branch Massey Creek	0.006	-	Secondary	To enlarge
Upper Cub Run STP (FCSD)	Fairfax County	Cub Run	0.250	0.071	Secondary	To connect to another facility
Middle Cub Run STP (FCSD)	Fairfax County	Cub Run	0.250	0.440	Secondary	To upgrade facilit
Madeira School	Greenway, Fairfax County	Difficult Run	-	0.002	Secondary	-
Colchester Public Service Corp.	Fairfax County	Massey Creek	0.040	0.016	Secondary	To upgrade facility
Green Briar Hills (FCSD)	Fairfax County	Big Rocky Run	0.500	p.616	Secondary	To upgrade facility
Flatlick Branch STP (FCSD)	Fairfax County	Flatlick Branch	0.250	0.269	Secondary	To expand facility

TABLE I 1 (con't.)

DOMESTIC

VIRGINIA

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Big Rocky Run STP (FCSD)	Fairfax County	Big Rocky Run	0.068	0.250	Secondary	To upgrade facility
Gardner Trailer Court	Gainsville, Prince William	Trib of North Fork	-	0.025	Secondary	-
Lakeview Estates	Gainesville Prince William	Trib of Rocky Branch	0.35	0.030	Secondary	To connect to another facility
Dale City	Prince William Cou	Neabsco Creek	2.000	2.200	Secondary	To upgrade facility
Dumphries Eleme School	Prince William Co	Quantico Creek	-	0.007	Secondary	-
Gainsville District ES	Haymarket Prince William Co.	Little Bull Run	-	-	Secondary	-
Coles Run Elem School	Prince William Co.	Powells Creek	-	-	Secondary	-
Special Education School	Independent Hill Prince William Co.	Trib of South Fork	-	0.040	Secondary	-
Northside STP	Manassas Prince William County	Trib of Flat Branch	1.090	0.856	Secondary	To upgrade facility
Jennie Dean Jr. High School	Manassas Prince William County	Trib of Cannon Branch	-	0.010	Secondary	-
Liberia Plant	Manassas Prince William County	Trib of Bull Run	-	0.010	Secondary	-

TABLE I 1 (con't.)

DOMESTIC

VIRGINIA

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Manassas Park Plant #1	Prince William County	Trib of Flat Branch	0.344	0.276	Secondary	To connect to another system
Manassas Park Plant #2	Prince William County	Trib of Flat Branch	0.344	0.298	Secondary	" "
Nakesville-Brentsville District H.S.	Prince William Co	Slate Run	-	0.250	Secondary	-
Partridge School	Prince William Co	Trib of Broad Run	-	0.002	Secondary	-
Prince William Potomac Plant (OWSD)	Prince William Co.	Potomac River	-	-	Secondary	Planned facility
Occoquan Plant (OWSD)	Prince William Co.	Potomac River	0.300	0.244	Secondary	To connect to another facility
Convict Comp #6	Prince William Co.	Trib of Neubs Cove Creek	-	0.005	Secondary	-
Neabsco Plant (OWSD)	Prince William Co.	Neabsco Creek	1.250	1.384	Secondary	To connect to another facility
Marumsco Plant (OWSD)	Prince William Co.	Farmsco Creek	1.000	1.244	Secondary	" "
Feather stone Plt.	Prince William Co.	Farm Creek	0.300	0.577	Secondary	" "
Centerville STP (GMBD)	Prince William Co.	Trib of Quantico Creek	1.000	0.917	Secondary	To upgrade facilities
Melrose Gardens	Prince William Co.	Trib of Quantico Creek	0.250	0.130	Secondary	To connect to another facility

TABLE I 1 (con't.)

DOMESTIC

VIRGINIA

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	Actual Flow	Degree of Treatment	Status
Westgate STP (GMSD)	Prince William County	Bull Run	0.960	1.035	Secondary	To connect to another facility
Dumfrier Triangle Sanitary District	Prince William County	Quantico Creek	1.000	0.795	Secondary	To upgrade facility
Garfield High School	Prince William County	Trib of Neabsco Creek	-	0.015	Secondary	-
Gleaton's Trailer Park	Prince William County	Trib of Marumsco Creek	-	0.020	Secondary	-
Washington-Reed Elem. School	Prince William County	Trib of Quantico Creek	-	0.003	Secondary	-
Upper Occoquan STP	Prince William County	Occoquan Creek	-	-	Advanced Waste treatment	Planned facility
Field Unit #26 (VA.)	Prince William County	Black Branch	0.003	0.012	Secondary	-
Freestone Point	Prince William County	Powells Creek	-	0.005	Secondary	-
Garber Trailer Court	Prince William County	Trib of Hooes Run	-	0.024	Secondary	-
B. Lowe Trailer Park	Prince William County	Occoquan Creek	-	0.070	Secondary	-
Linton Hall School	Prince William County	Trib of Broad Run	0.040	-	Primary	To connect to another facility

TABLE II (con't.)

DOMESTIC

VIRGINIA

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Woodbridge Clay	Prince William County	Trib to Connon Creek	-	-	Secondary	-
Triangle Elementary School	Prince William County	Little Creek	-	0.006	Secondary	-
Farest Grove	Prince William County	Purcell Branch	-	-	Secondary	-
Arlington County STP (2)	Arlington County	Four Mile Run	24.000	21.700	Secondary	To upgrade facility
Pentigon STP	Arlington County	Boundry Channel	3.200	1.060	Secondary	To connect to another facility
Alexandria STP (4)	Alexandria	Hunting Creek	18.000	22.700	Secondary	To upgrade facility

TABLE I 2
INDUSTRIAL FLOW

MARYLAND

FACILITY NAME	COUNTY	RECEIVING STREAM
Potomac Electric Power Company - Morgantown	Charles County	Potomac River
Academy Natural Science - Philadelphia Ben	Charles County	Patuxent River
Naval Ordance Station	Charles County	Potomac River
Contee Sand & Gravel Company, Inc.	Montgomery County	Paint Branch, Trib
Rockville Crushed Stone, Inc.	Montgomery County	Sandy Branch, Trib
Flintkote Co-Boyds Ready Mix	Montgomery County	Ten Mile Creek
Naval Ord Lab White Oak Siv Sp	Montgomery County	Paint Branch
Potomac Electric Power Company - Dickerson	Montgomery County	Potomac River
Naval Ship Research & Dev Center	Montgomery County	Potomac River
Stoneyhurst Quarries	Montgomery County	Cabine John Creek
Maryland & VIrginia Milk Products Assn.	Prince George's County	Hammonds Branch
Buffalo Sand & Gravel	Prince George's County	Henson Creek
Naval Communication Station-Washington	Prince George's County	Piscataway Creek
Inland Materials Inc. - Clinton	Prince George's County	No Name
Contee Sand & Gravel Co., Inc	Prince George's County	Indian Creek
Andrews Air Force Base	Prince George's County	Trib Piscataway
A. H. Smith - Sand & Gravel - Washington P	Prince George's County	Indian Creek
Potomac Electric Power Company - Chalk Point	Prince George's County	Patuxent Tiver
McLeod & Romborg Stone Company, Inc.	Prince George's County	NE Branch Anacostia
Mineral Pigments Corporation - Beltville	Prince George's County	Indian Creek Trib
Tecfab of Maryland, Division of Con Plank	Prince George's County	Indian Creek Trib

TABLE I1 (con't.)
DOMESTIC

VIRGINIA

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Woodbridge Clay	Prince William County	Trib to Connon Creek	-	-	Secondary	-
Triangle Elementary School	Prince William County	Little Creek	-	0.006	Secondary	-
Farest Grove	Prince William County	Purcell Branch	-	-	Secondary	-
Arlington County STP (2)	Arlington County	Four Mile Run	24.000	21.700	Secondary	To upgrade facility
Pentigon STP	Arlington County	Boundry Channel	3.200	1.060	Secondary	To connect to another facility
Alexandria STP (4)	Alexandria	Hunting Creek	18.000	22.700	Secondary	To upgrade facility

TABLE I 2

INDUSTRIAL FLOW

MARYLAND

FACILITY NAME	COUNTY	RECEIVING STREAM
Potomac Electric Power Company - Morgantown	Charles County	Potomac River
Academy Natural Science - Philadelphia Ben	Charles County	Patuxent River
Naval Ordance Station	Charles County	Potomac River
Contee Sand & Gravel Company, Inc.	Montgomery County	Paint Branch, Trib
Rockville Crushed Stone, Inc.	Montgomery County	Sandy Branch, Trib
Flintkote Co-Boyds Ready Mix	Montgomery County	Ten Mile Creek
Naval Ord Lab White Oak Siv Sp	Montgomery County	Paint Branch
Potomac Electric Power Company - Dickerson	Montgomery County	Potomac River
Naval Ship Research & Dev Center	Montgomery County	Potomac River
Stoneyhurst Quarries	Montgomery County	Cabine John Creek
Maryland & VIrginia Milk Products Assn.	Prince George's County	Hammonds Branch
Buffalo Sand & Gravel	Prince George's County	Henson Creek
Naval Communication Station-Washington	Prince George's County	Piscataway Creek
Inland Materials Inc. - Clinton	Prince George's County	No Name
Contee Sand & Gravel Co., Inc	Prince George's County	Indian Creek
Andrews Air Force Base	Prince George's County	Trib Piscataway
A. H. Smith - Sand & Gravel - Washington P	Prince George's County	Indian Creek
Potomac Electric Power Company - Chalk Point	Prince George's County	Patuxent Tiver
McLeod & Romborg Stone Company, Inc.	Prince George's County	NE Branch Anacostia
Mineral Pigments Corporation - Beltville	Prince George's County	Indian Creek Trib
Tecfab of Maryland, Division of Con Plank	Prince George's County	Indian Creek Trib

TABLE I 2 (con't.)

INDUSTRIAL FLOW

VIRGINIA

FACILITY NAME	COUNTY	RECEIVING STREAM
American Oil Company-Fairfax City Virvinia	Fairfax City	Daniels Run
Humble Oil Refining Company - Fairfax	Fairfax County	Allotink Creek
Shell Oil Company-Newington, Virginia	Fairfax County	Accotink Run
H. Smith Bowman Distillery	Fairfax County	Colvin Run
R. C. Nehi Bottling Company-Washington	Fairfax County	Flagg Run
Vepco Possum Pt.	Prince William County	Mine Spring Run
Marine Corps Base-Naval Hospital	Prince William County	Potomac River
Texaco Inc-Fairfax Sales	Fairfax City	Trib Accotink C
Vulcan Materials Company-Mideast	Prince William County	Occoquan Creek
Vulcan Materials-Manassas	Prince William County	Flat Branch
U.S. Army-Reactors GRP-SMI Plant	Fairfax County	Gunston Cove
Robinson Concrete-Batching Factory	Alexandria City	Potomac River
Virginia Concrete Shirlington	Arlington County	Four Mile Run
Virginia Concrete Woodbridge	Prince William County	Occoquan Creek
Potomac Electric Power Company Generating Station	Alexandria City	Potomac River
Fairfax County Water Authority-Occoquan	Fairfax County	Occoquan
Norton & Company, Inc.-Alexandria	Alexandria C[illegible]	Potomac River
Arlington Hall Station-USAG	Arlington County	Doctor's Branch
Duke's Car Wash, Inc.	Alexandria City	Holme's Run

TABLE I 3

FEDERAL INSTALLATIONS

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Agriculture Research Center	Beltsville, Prince George Co.					
East Plant (113)		Beaverdam Cr.	0.5	0.4	Secondary	Upgrading facility
West Plant (114)		Little Point Br.	0.2	0.16	Secondary	" "
Naval Proving Grounds (Army)	Indian Head, Charles County					
Imhoff System		Mattawoman Cr.	0.21	-	Secondary	-
Plant #4		Mattawoman Cr.	0.15	0.001	Secondary	-
Nike Site-92 (416)	Muddy Branch Montgomery Co.	Muddy Branch	-	0.003	Secondary	-
Nike Sites-Hobbs Rd.	Olney-Montg Co.	Trib to Hawlings River(Patuxent)	-	-	Secondary	-
NikesSite School	SSauffers, Montgomery Co.	Cobin Branch	-	-	Secondary	-
Nike Housing Site	Waldorf, Charles County	Mattawoman Cr.	0.005	0.005	Secondary	Connect to Charles County system
Civil Defense Office	Olney, Montgomery Co.	Trib Hawlings River (Patuxent)	0.010	-	Secondary	-
Brandywine Family Housing Site	Brandy Wine, Prince George County	Mataponi Cr. (Patuxent)	-	0.003	Secondary	-
Andrews AFB	Camp Springs, Prince George County					
Plant #1 (117)		Meeting House Br.	0.93	1.0	Secondary	Connect to Piscataway
Plant #3		Cabin Branch (Patuxent)	.48	0.4	Secondary	Connect to western Branch
Plant #4 (119)		Payne Branch	0.125	.04	Secondary	Connect to Piscataway

TABLE I 3 (con't.)
FEDERAL INSTALLATIONS

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Naval Communication Station (266)	Cheltahham Prince George Co.	Piscataway Creek	0.050	0.067	Secondary	Comment to Piscataway
Naval **Ordance Station**	Indian Head Charles County					
Plant #1		**Potomac River**	0.350	0.250	Secondary	--
Plant #2		Mattawoman Cr.	0.150	0.360	Secondary	-
Plant #3		**Potomac River**	0.025	0.006	Secondary	-
Plant #4		**Mattawoman**	**0.02**	**0.10**	**Secondary**	-
Naval Ordnance Lab (110)	White Oak Montgomery Co.	Point Branch	0.100	0.065	Secondary	Connect to WSSC
NIH Animal Center (252)	Poolesville Montgomery co.	Broad Run Creek	0.100	0.070	Secondary	-
Patuxent Wildlife Research Center	Bowie Prince George Co.	Mallard Pond (Patuxent)	0.035	-	Secondary	-
Fort Belvoir	Fairfax County					
Plant #1		Gunston Cove	0.500	0.600	Secondary	Connect to Lower Potomac STP
Plant #2		Potomac River	2.300	2.340	Secondary	" "
Camp Upshur	Quantico/Prince	Cedar Run	0.140	0.127	Secondary	Upgrading facilities
Marine Base Main Post	Quantico/Prince William County	Potomac River	1,750	1.600	Secondary	" "
Virginia Heating (3) & Sewage Disposal Plant(Pentigon)	Arlington	Potomac River Boundary Channel	3.200	1.06	Secondary	Connect to Arlington System

TABLE I 3 (con't.)

FEDERAL INSTALLATIONS

MARYLAND

NAME	LOCATION	RECEIVING STREAM	DESIGN FLOW	ACTUAL FLOW	DEGREE OF TREATMENT	STATUS
Harry Diamond Lab	Gathersburg Montgomery Co.	Trib of Cabin Branch	0.008	-	-	-
220th Army Reserve Unit	Montgomery Co.	Cabin Branch	0.003	-	-	-
Nike Base Headquarters	Montgomery Co.	Irrigation	0.010	-	-	-
Pharmacological Lab	Prince George County	Beaverdam Creek	0.020	-	-	-

APPENDIX J

ENVIRONMENTAL ASSESSMENT, PROPOSED 108"
EFFLUENT CONDUIT ACROSS PISCATAWAY PARK,
MARYLAND; PREPARED BY NATIONAL CAPITAL
PARKS, NATIONAL PARK SERVICE

APPENDIX J

ENVIRONMENTAL ASSESSMENT

PROPOSED 108" EFFLUENT CONDUIT ACROSS PISCATAWAY PARK, MARYLAND

Prepared by
National Capital Parks
National Park Service
Washington, D.C.

United States Department of the Interior

NATIONAL PARK SERVICE
NATIONAL CAPITAL PARKS
1100 OHIO DRIVE SW.
WASHINGTON, D.C. 20242

IN REPLY REFER TO:
L7619-NCP (CUPE)

DEC 21 1973

Mr. Daniel P. Snyder, III
Regional Administrator
Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

Enclosed is our assessment for the proposed 108-inch effluent conduit across Piscataway Park. As we understand it, this assessment will be included in your draft environmental impact statement for the proposed expansion of the Piscataway sewage treatment plant.

Our assessment addresses the impact of the single alternative of a pipeline crossing the park and does not cover other alternatives to effluent discharge such as land disposal, discharge into Piscataway Creek or a pipeline under the creek. Within this context, then, this assessment does not represent the position of the National Park Service or the Department of the Interior on the proposed expanded treatment plant or the pipeline crossing within Piscataway Park. When the Interior Department has received the draft environmental impact statement, a thorough review of the overall proposal will be undertaken. In this review, other agencies within the Department may, indeed, question some of the material in our assessment.

I have also enclosed a list of organizations which we know are interested in the proposal. Also enclosed is a draft of our permit conditions if the proposal is implemented. These permit conditions would most likely be adjusted depending on the comments received through the environmental impact statement review procedures. These provisions represent our present thinking; however, the final provisions of any such permit will be subject to the review of the Office of the Interior Department Solicitor. We also have a long-standing commitment to the House Interior and Insular Affairs Committee to offer the permit for its review before it is issued.

Sincerely yours,

Manus J. Fish Jr.

Director, National Capital Parks

Enclosures 3

Correspondence from the Maryland Historical Trust	Attachment 1
Correspondence from the Virginia Historic Landmarks Commission	Attachment 2
Correspondence from WSSC concerning the impacts on Piscataway Park	Attachment 3
Correspondence from WSSC concerning possible ground water problems and dredge spoil disposal	Attachment 4
Correspondence concerning possible exceptions permitting construction activities during the Bicentennial Year and the Spawning Seasons	Attachment 5

I DESCRIPTION OF THE PROPOSAL

The project action under consideration is the installation of a buried 108 inch diameter conduit for the transport of the treated effluent from Piscataway waste treatment plant to the main channel of the Potomac River estuary. The construction of the conduit should take 8 to 10 months to complete.

The treatment plant is situated on a 313.2-acre tract of land, located on the southerly side of the Piscataway embayment and at its most easterly end. It is bounded on the east by Indian Head Highway and on the south by Farmington Road. The proposed pipeline will begin approximately 300 feet east of the west property line of this tract of land and follow in a westerly course, roughly paralleling the southern bank of the embayment at a distance varying from 1,000 to 3,000 feet to the south of it. The right-of-way of the proposed pipeline is shown in Figures 6 & 7.

A. The Land Operation

The total length of the buried pipeline will be 16,300 feet. The initial 300 feet will be on property owned by the WSSC. It will then traverse in a westerly direction over a number of privately owned tracts of land for a distance of 5,500 feet. At this point, the line enters Federal property within Piscataway Park and continues in a westerly direction for a distance of approximately 2,200 feet, thence entering private property again for a distance of some 4,500 feet still in a westerly direction. From there it again enters land under the jurisdiction of The National Park Service and turns in a northwesterly direction for a distance of approximately 3,800 feet to the banks of the Potomac River. Approximately 6,000 feet of the buried pipeline will traverse Park Service property and 10,300 feet will traverse private property.

Slightly less than 20 acres of land is involved in the project. Approximately 13 acres will lie within the boundaries of a 50-foot right-of-way which has been acquired by the WSSC through successful negotiation with the owners of ten privately owned tracts of land. The balance of less than 7 acres is presently Federal land.

The pipeline will follow the general contour of the land, maintaining the necessary cover and grade to permit the treated effluent to flow by gravity to the main channel of the estuary. The initial activity will be to clear the land to the extent necessary to accommodate the excavation. The topsoil will be stored for replacement upon completion of the project. One access road will be constructed along the right-of-way for the transport of men and materials from existing public roads serving the area. The bulldozers, scrapers and grading equipment used to implement this phase will be followed by excavating equipment. As the trench is opened to the necessary depth, the pipe-laying operation will begin. A piece of equipment called a mule will be used in the trench excavation. This will shore up the sides of the trench. This will require pick and shovel work to provide the correct grade and assure good support of the pipe, followed by placement of the pipe by crane. The trench will be opened for short sections at a time (100-200 feet) and will be backfilled as soon as the pipe has been installed. The last step of landscaping and seeding will involve light equipment and manual labor for the most part. The pipe will be reinforced concrete for its entire length, and all pipe joints, manhole covers, and air-reliefs and accessories will be water-tight pressure fittings.

During the excavation, the trench may be infiltrated by ground water. This will require pumping from the trench onto the ground adjacent to the right-of-way. This water will be evenly distributed on the adjacent areas carefully avoiding flooding or dumping into surface streams.

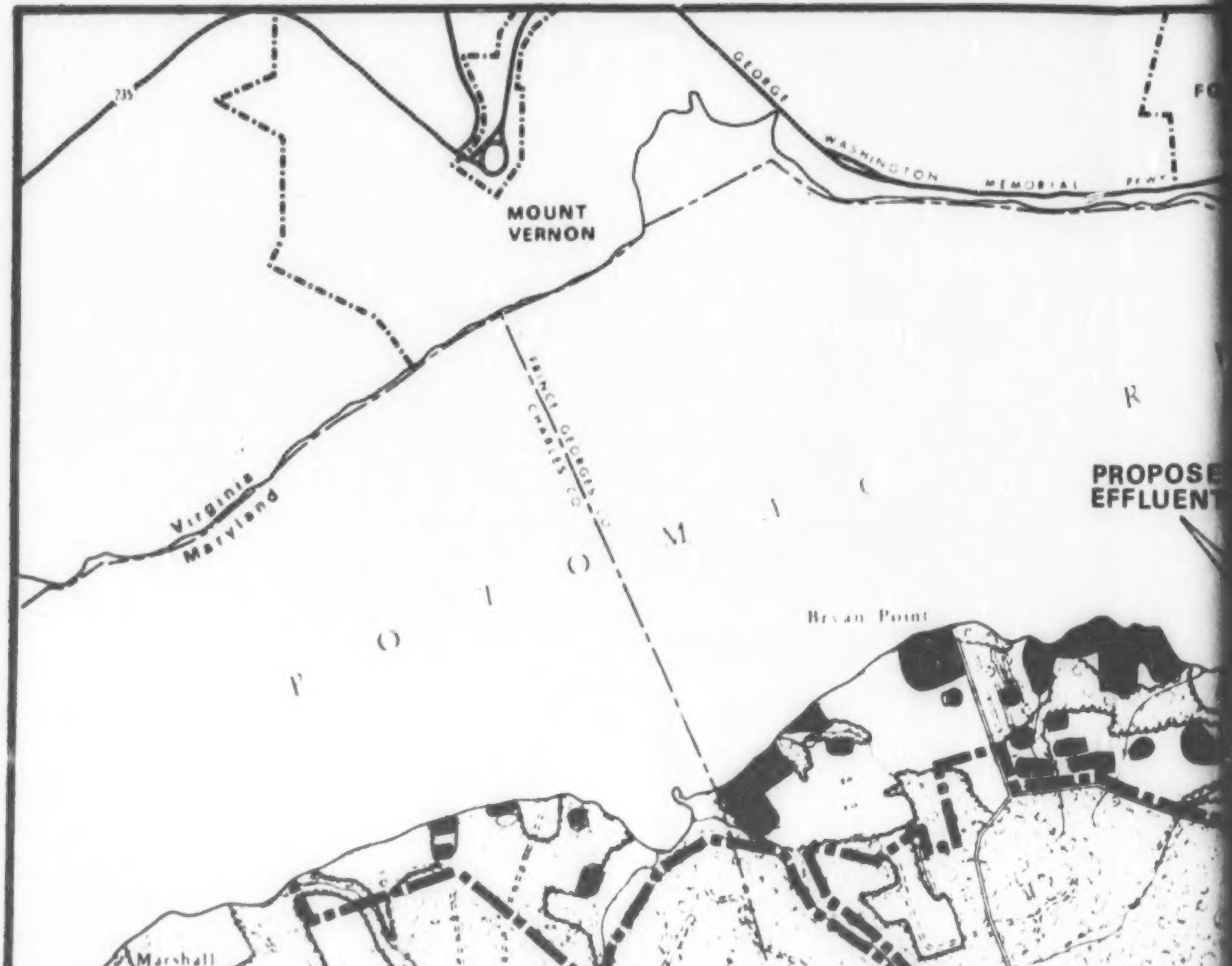
Disposal of excess earth, undergrowth and trees removed during the land-clearing operation will be the responsibility of the contractor and carried out in accordance with State and/or local regulations regarding land disposal operations.

B. The Marine Operation

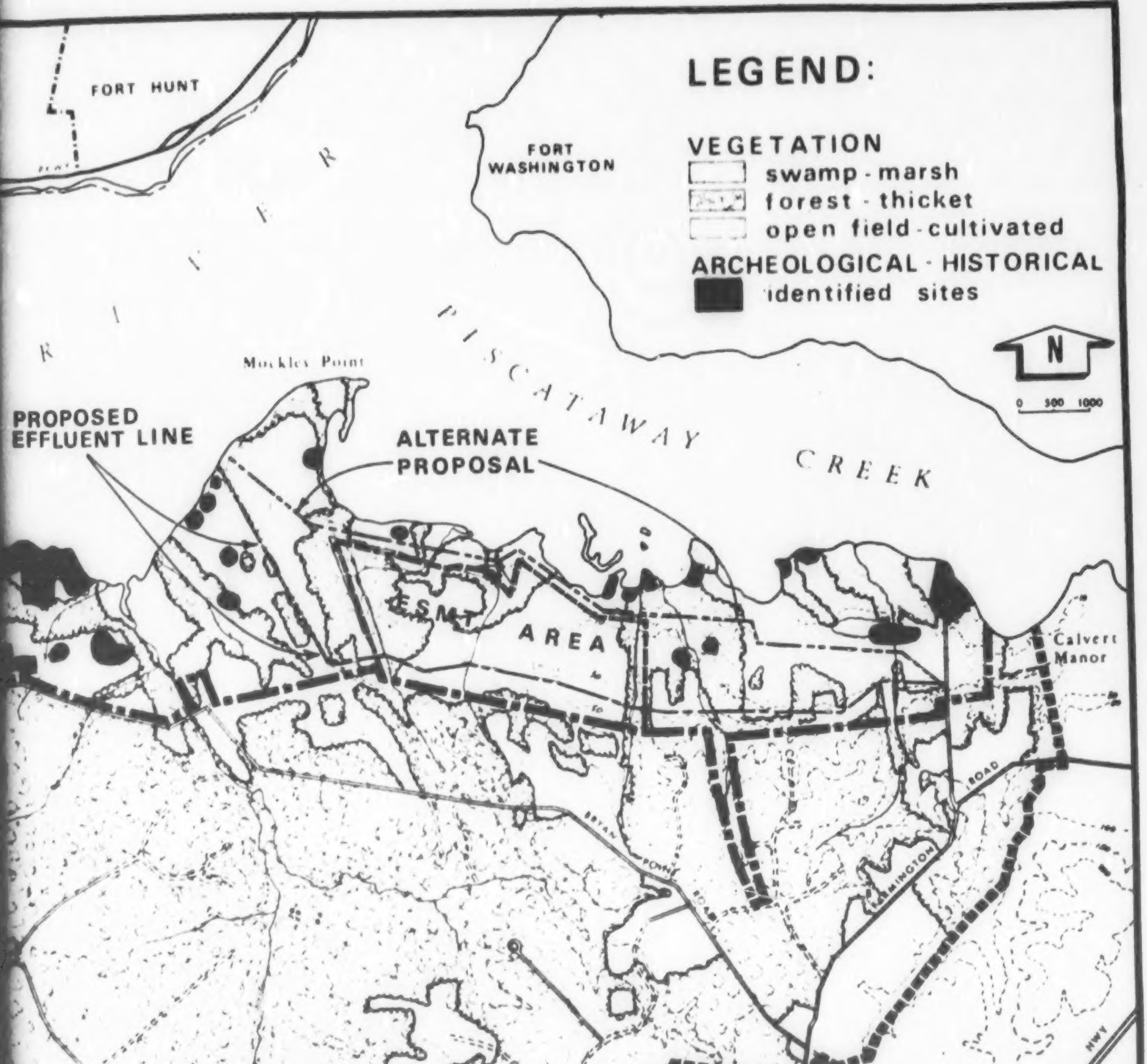
The outfall line will extend approximately 1,440 feet in a northwesterly direction beneath the shallows of the Potomac River, ending on the southeastern edge of the main channel just south of Mockley Point. The land area involved will be that required for storage and access roads for transport of men, equipment and material.

The top of the pipe will be approximately 24 inches below the sediment level, thereby avoiding future interference with navigation or potential damage to the pipe. The initial phase of work will be to excavate a trench in the bottom sediments in which to place the outfall line. This dredging operation will require lifting bottom sediment as found into a barge which will transport it to an established disposal area.

The draft required for a loaded barge dictates that the entire trench be dug, starting from the channel and working toward the bank. This would be followed by the pile-driving operation and placement of supporting members for the conduit, and finally the installation of the pipe itself. The end of the pipe on the edge of the channel will be anchored in a pre-cast concrete headwall, which will in turn be anchored to steel sheathing. The sheathing will be driven into the existing bottom for approximately 35 feet along the channel on each side of the pipe at depths ranging from 9 to 17 feet below the river bottom.



PISCATAWAY PARK
U.S. DEPARTMENT of the INTERIOR
NATIONAL PARK SERVICE


LEGEND:
VEGETATION
swamp - marsh
forest - thicket
open field - cultivated
ARCHEOLOGICAL - HISTORICAL
identified sites
N
0 500 1000
FORT HUNT
FORT WASHINGTON
RIVER
PISCATAWAY CREEK
Mockley Point
PROPOSED EFFLUENT LINE
ALTERNATE PROPOSAL
ESMT AREA
Calvert Manor
BRYAN POINT ROAD
FARMINGTON ROAD
INDIAN HEAD HWY
210
Accokeek
KEY:
park boundary
scenic easement area

"Nautical Chart 101-SC-Potomac River" dated 12/19/70, published by the National Oceanic and Atmospheric Administration, Department of Commerce, indicates that the channel depth at this point is 55 to 60 feet. The invert of the pipe at the channel will be submerged well below mean low water level and be a minimum of 10 feet above the channel bottom. This location will be selected to promote optimum mixing and minimum sediment scouring due to the discharge from the proposed outfall.

The total area of substrate subject to excavation for the installation of the outfall line is on the order of 2 acres. The trench will be approximately 10-13 feet deep, 15 feet wide at the bottom, and 60-70 feet wide at the top, depending on the stability of the bottom material. The volume of material that will be removed is on the order lf 30,000 cubic yards. The test boring log records show the excavated material to be sand, sandy silt, silt, clay and gravel. One out of five cores indicated the presence or organic material some 900 feet from the bank.

II DESCRIPTION OF THE ENVIRONMENT

A. Land Area

The proposed project action takes place in Prince George's County, Maryland, approximately 10 to 12 miles south of Washington, D.C. The tract of land through which the conduit right-of-way will pass is bounded on the north by the Piscataway embayment, on the south by Farmington and Bryan Point Roads, on the east by Indian Head Highway and the west by the Potomac River, encompassing an area of some 2,000 acres.

The mouth of the Piscataway embayment has on its southern side a cornucopia-shaped spur of land called Mockley Point; this point of land is part of Piscataway Park. The parkland and privately owned land extend to the east along the Piscataway embayment, which is the land traversed by the proposed project action. This land can be broadly characterized as typical undeveloped scrub woodlands except those areas that have been cleared and cultivated as pasture land or for the growth of crops such as corn, beans and tobacco. The wooded sections are largely covered with second-growth trees and shrubs. The largest arboreal species are sycamores (Platanus occidentalis) of approximately 24-inches-diameter at breast height (DBH) and 40 feet tall. Some of the woodlands are used as pasturage and little or no understorey species other than red cedar (Juniperus virginiana) exist. In non-pastured woods the dense undergrowth is frequently dominated by greenbrier (Smilax sp.), wild rose (Rosa sp.) and honeysuckle (Lonicera sp.).

Four small, intermittently flowing creeks will be crossed by the line during construction. No fish are evident in these tiny creeks, but during spring floods and high water, spawning of some species might occur in the mouths of these creeks at their confluence with the Piscataway embayment.

The wooded sections represent 7 acres or less of the 19 to 20 acres of land included in the right-of-way for the proposed pipeline. The remainder of the land affected is presently fallow in crops or pasturage. The topography in these sections is essentially similar throughout in that it is gently rolling land, sloping toward the Piscataway embayment to the north and the Potomac River to the west. Two stands of trees, composed largely of second-growth, even-aged oaks (Quercus sp.) and maples (Acer sp.) of about 1-foot DBH and 35 feet tall, would be bisected by the proposed action.

B. Wildlife

The Piscataway embayment provides a sheltered area for waterfowl, and the cattail marsh which extends well up into the upper end of the bay area provides nesting sites and food for many birds. Marshes support 15 or 20 birds per acre, and are of immense importance in the ornithological field. Of the 37 species of waterfowl which may winter on Piscataway embayment and/or feed in the marsh, 11 species (more than 115 birds) were sighted from the shore on March 1, 1972 (Table A). These figures show that the embayment and its marshes are, as expected, highly attractive to wintering birds.

At present, the habitat for land birds in the embayment area is highly varied, and even includes a small residential area. There are several woods which range from scrub to stands of sycamore and pine with particularly fine specimens of holly trees (25 feet high and a foot in diameter). These woods have a generous supply of underbrush consisting of wild rose, greenbrier and honeysuckle. Much of the land in this area is farmland providing cultivated fields and pastures; many of the latter include cedar trees.

Such a varied environment attracts so many species that the available food becomes the limiting factor. The area covered by a bird in search of food depends on whether the bird is wintering or nesting. During the nesting season, the food is comparatively concentrated and the range is restricted to a few hundred yards for most species; during the winter, birds may travel miles to obtain sufficient food.

C. Land Use

1. Piscataway Park and Embayment

As delineated in the project description section of this report, the proposed pipeline passes through two tracts of land that are U. S. Government owned. These sections of land represent only a small portion of the area that will eventually make up the entire Piscataway Park facility.

This park came into existence by passage of a joint resolution by the 87th Congress of the U. S. in October, 1961, Public Law 87-362. This law and subsequent laws authorized the acquisition of lands or restrictive easements on lands totalling 4,014 acres. It is anticipated that all acquisition will be completed by January, 1974.

TABLE A

BIRDS SIGHTED OR HEARD IN PISCATAWAY AREA MARCH 1, 1972

#	Common Name	Genus and Species	Type
1	Horned Grebe	Podiceps auritus	Waterfowl
2	Whistling Swan	Olor columbianus	Waterfowl
3	Mallard	Anas platyrhynchos	Waterfowl
4	Ring-Necked Duck	Aythya collaris	Waterfowl
5	Greater Scaup	Aythya marila	Waterfowl
6	Lesser Scaup	Aythya affinis	Waterfowl
7	Bufflehead	Bucephala albeola	Waterfowl
8	Turkey Vulture	Cathartes aura	Land Bird
9	Red-Shouldered Hawk	Buteo lineatus	Land Bird
10	Sparrow Hawk	Falco sparverius	Land Bird
11	Killdeer	Charadrius vociferus	Land Bird
12	Ring-Billed Gull	Larus delawarensis	Waterfowl
13	Herring Gull	Larus argentatus	Waterfowl
14	Bonaparte's Gull	Larus philadelphia	Waterfowl
15	Mourning Dove	Zenaidura macroura	Land Bird
16	Red-Bellied Woodpecker	Centurus carolinus	Land Bird
17	Downy Woodpecker	Dendrocopos punbescens	Land Bird
18	Blue Jay	Cyanocitta cristata	Land Bird
19	Common Crow	Corvus brachyrhynchos	Land Bird
20	Carolina Chickadee	Parus carolinensis	Land Bird
21	Tufted Titmouse	Parus bicolor	Land Bird
22	White-Breasted Nuthatch	Sitta carolinensis	Land Bird
23	Carolina Wren	Thryothorus ludovicianus	Land Bird
24	Mockingbird	Minus polyglottos	Land Bird
25	Golden-Crowned Kinglet	Regulus Satrapa	Land Bird
26	Starling	Sturnus vulgaris	Land Bird
27	Myrtle Warbler	Dendroica coronata	Land Bird
28	House Sparrow	Passer domesticus	Land Bird
29	Eastern Meadowlark	Sturnella magna	Land Bird
30	Red-Wing Blackbird	Agelaius phoeniceus	Land Bird
31	Common Grackle	Quiscalus quiscula	Land Bird
32	Brown-Headed Cowbird	Molothrus ater	Land Bird
33	Cardinal	Richmondena cardinalis	Land Bird
34	Purple Finch	Carpodacus purpureus	Land Bird
35	American Goldfinch	Spinus tristis	Land Bird
36	Rufous-Sided Towhee	Pipilo erythrophthalmus	Land Bird
37	Slate-Colored Junco	Junco hyemalis	Land Bird
38	White-Throated Sparrow	Zonotrichia albicollis	Land Bird
39	Song Sparrow	Melospiza melodia	Land Bird

At present, the development of the park area is minimal. Park records indicate that 45,000 or more visited the park during 1972. There are no plans for further development of the area at present. It does seem probable that during the next 30 to 50 years, the area will be developed as a limited recreation facility.

Piscataway embayment, a shallow estuary of Piscataway Creek, stretches the entire length of the parkland on the north, providing approximately 800 acres of open water. The embayment has considerable esthetic and recreational value as an adjunct to the park.

2. Dyke Marsh

This area, which is 4 1/2 miles north of the project action on the Virginia side of the estuary, was at one time owned by the Potomac Sand and Gravel Company, but in 1959 was transferred to the U. S. National Park Service.

Sand and gravel operations are still being carried out by the Potomac Sand and Gravel Company under a 20-year right by agreement with the National Park Service. Pursuant to authorizing legislation, disposal of dredged spoil material and clean waste generated by various construction activities has been allowed by permit under the auspices of the National Park Service. The Park Service is currently assessing various methods for accomplishing this filling proposal to avoid sediment contamination of the Potomac River. Until this assessment is complete, no fill material will be placed in the restoration area.

The materials placed will be monitored regularly by EPA field office personnel. The excavated areas, which are up to 20 feet deep, will be filled to within 3 feet of the high water level. The plan is to return the area to a condition typical of its original state. This will be accomplished mainly through vegetative development after the fill operation is finished. Upon completion, it is expected that approximately 500 acres of restored marsh area will be established by the program.

3. Fort Foote

Located in Maryland directly opposite Dyke Marsh on the Virginia side of the estuary, Fort Foote occupies 66 acres. Picnic grounds surround the ruins of the Fort. Although records are not kept regarding the number of year-round visitors, the use of the area is moderate.

4. Fort Washington

Fort Washington, which occupies 341 acres, is located in Maryland on the north bank of the Piscataway embayment and east bank of the Potomac estuary, about a mile upstream from the point of discharge of the proposed outfall. Attractions at this park include the old fortifications, an extensive picnic area and a scenic view of the river. The area is open year-round, and in 1972 accommodated almost half a million visitors, 67% of these occurring from May to August, with the largest influx being on weekends.

5. Fort Hunt

This property is across the river from the proposed project, lying west of the George Washington Memorial Parkway. However, the parkway is of a higher elevation than the entire park area and the estuary is not visible from it. There are a pavillion and five picnic areas with about 400 picnic tables on 157 acres of land. During 1972 close to half a million people visited this area, most of them during the summer months.

6. The National Colonial Farm

On the southern end of Piscataway Park is a 148-acre tract of land formerly owned by the Accokeek Foundation, called The National Colonial Farm. This farm is maintained by the Foundation under a permit from the National Park Service as "a genetic research station devoted to the maintenance of crops and conditions of the mid-18th century." The tract is cleared, landscaped and cultivated, presenting a vista of rich green pasture land and well-kept structures and paths to the visitor.

7. Mount Vernon

Mount Vernon is located about 2 1/2 miles downstream from the proposed outfall. It is open for tourists the year around, and is visited annually by an average of one and a quarter million people, with the heaviest traffic occurring between April 1 and Labor Day, when the Wilson Line is in operation.

D. Archeological Values

1. Pre-History or Indian Period

This site is considered one of the most important sources of information on the pre-history of the Middle Atlantic Seaboard area. Excavations were made between 1935 and 1940 by Mrs. Alice L. L. Ferguson, and from the data obtained, the story of some 5,000 years of Indian occupation by seven distinct cultural groups of prehistoric people was interpreted, primarily by Dr. Robert L. Stephenson for the Alice Ferguson Foundation. An interpretation of the prehistoric Indian occupation is contained in a publication by Robert L. Stephenson, entitled, The Pre-historic People of Accokeek Creek, published by the Alice Ferguson Foundation. Stephenson enumerates the following sequence of human occupation for the Piscataway site:

ARCHAIC PERIOD Archaic People	3000 B.C.	to	500 B.C.
EARLY WOODLAND PERIOD Marcey Creek People and Pope's Creek People	500 B.C.	to	300 A.D.
MIDDLE WOODLAND PERIOD Accokeek People and Mockley People	300 A.D	to	1200 A.D.
LATE WOODLAND PERIOD Potomac Creek People and Susquehannock Tribe	1200 A.D.	to	1600 A.D.
COLONIAL PERIOD White People	1600 A.D.	to	1776 A.D.
AMERICAN PERIOD White People	1776 A.D.	to	present time

The Archaic people are described as nomadic. They lived in small groups, moved around from season to season, and probably lived at this site only a small part of the time span given above. They depended entirely on hunting, fishing, and the gathering of edible foods for their living. The people of the Early Woodland Period were the first pottery makers, but their life was still largely one of hunting, fishing, and gathering, with very little, if any, dependence upon rudimentary agriculture. The Middle Woodland people are characterized by a more developed pottery and the fact that agriculture was beginning to be important to their livelihood. The people of the Late Woodland Period established large permanent villages and were predominantly farmers, although still relying on hunting, fishing, and gathering for a substantial part of their diet. The Colonial Period of Piscataway was characterized by the arrival and settlement of English colonists seeking political, economic, and religious freedom. The people were engaged primarily in farming and the development of residential estates. The American Period, following the American Revolution to the present, has effected little change in the character of this area. Consistently free from commercial and industrial development, the land has remained in small farms and estates.

2. Colonial Period

From old maps, documentary evidence, and archeological excavations, it is evident that Mockley Point has been occupied intermittently for approximately 5,000 years, from the late "Archaic" Indian period well into the Colonial Period. At the time Captain John Smith made his exploration of the Potomac in 1608, a large village named "Moyaone" was situated on the Potomac side of the point, a short distance upstream from the mouth of the Accokeek Creek. This village was burned in 1623, in reprisal for the massacre of some Virginia settlers. The surviving Moyaones, instead of rebuilding it, merged with their neighbors, the Piscataways, who were also of the Algonkian stock, and had their village around on the other side of Mockley Point, on Piscataway Creek.

Lord Calvert, when he came up the Potomac in 1634, went out of his way to make a treaty of peace and friendship with the "Emperor" of the Piscataways before establishing his first settlement at St. Mary's. A little later, the Jesuits attempted to christianize the Piscataways. Father White built a chapel near their village in 1648, and is said to have printed catechisms and part of the gospels here in Algonkian. This was the first use of the printing press south of Massachusetts. However, this mission was abandoned within a few years because of the incessant raids made on the Piscataways by the Susquehannock Indians, who lived further north and constituted a buffer between the infant colony and the dreaded Iroquois. Indeed, so serious was the Iroquois menace, the province of Maryland established a fort on Piscataway Creek in 1644, and garrisoned it with friendly Indians and a handful of drafted white settlers.

About this time, too, the Susquehannocks and the Piscataways decided to ally themselves against their common enemy, the Iroquois. But the alliance eventually proved futile. After twenty years of incessant warfare, the Iroquois decisively defeated the Susquehannocks in 1673, and the survivors drifted down to Piscataway Creek, where they were soon being blamed, on the whole unjustly, for sporadic raids on both sides of the Potomac. Seeking to retain their friendship, the provincial government offered to resettle them on land further up the Potomac River, in the vicinity of Great Falls, but the Susquehannocks lingered on at Piscataway despite the growing likelihood of a clash between them and the local Indians, or the settlers.

Finally, in 1675 after a number of disturbances on both sides of the river, the governments of both Maryland and Virginia took steps to move the Susquehannocks, by force if necessary, up to Great Falls. Maryland raised 500 men and Colonel John Washington, grandfather of George Washington, brought an equal number over from Virginia. Then, instead of the removal being negotiated, several of the Susquehannock leaders were treacherously seized and killed and the remainder beseiged in their fort, a bastioned stockade. Though they had only a hundred fighting men, the Susquehannocks put up a stiff resistance, holding off the Colonials and their Indian allies (which included the Piscataways) for more than six weeks. Finally, they managed to escape with their women and children over into Virginia.

Accounts of the Piscataway Indians and their contact with the explorers and colonists may be found in The Piscataway Indians of Southern Maryland, by Alice L. L. Ferguson and Henry G. Ferguson. The colonial period is described in Colonial Piscataway, by Katherine A. Kellock.

III ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

The proposed project involves two distinct ecosystems that require individual consideration: the buried pipeline traversing the land area, and the outfall line into the main channel of the estuary.

A. The Buried Pipeline

The pipeline, in general, will take the shortest route from the treatment plant to the bank of the Potomac. The right-of-way for the proposed pipeline encompasses something less than 20 acres of land. Approximately 6,000 feet of the 50-foot right-of-way occupies wooded area, of which 5,000 feet is privately owned. The remaining 10,300 feet will pass through crop or pasture land.

1. Plant and Wildlife

The major impact on the land segment of the project will be that encountered in the wooded areas. The land must be cleared of most underbrush and trees for a 40 to 50-foot width. No selective preservation can be anticipated within 15 feet of the centerline of the pipeline. Beyond this, it may be possible to preserve the larger trees.

A survey of government properties in Piscataway Park was completed in December, 1972. The survey traversed the proposed path of the conduit, and aboreal species were studied which were present within a 50 foot wide zone straddling the proposed center line of the conduit.

A total of 72 trees over nine inches DBH was found to occur within the 50 foot wide zone straddling the center line. Of these, oak and sweetgum were most common, totalling 21 each. For trees in the group from three to nine inches, the sweetgum was the most common in that 58 were counted. Persimmon was second most abundant with 29; black locust was third with 22. A total of 165 trees were recorded in the three to nine inch DBH category.

The largest tree from which an increment core was taken, was a black oak of 22 1/2 inches diameter. It was found to be 52 years old. The next largest tree was a 17 1/2 inch pin oak which was found to be 52 years old also. The oldest tree found was a 13 inch sycamore and it was 58 years old. The youngest and smallest tree cored was a five inch black locust which was 14 years old. Coring results indicate that it would take approximately 50 years to achieve the same size trees that are presently growing in the area. Good management planning and appropriate thinning may achieve the same size trees in about two thirds of the time that it takes for them to grow under natural conditions.

The proposed conduit would pass through government property plus the private tracts of Breese, Smith and Underwood, and its effect within the Piscataway Park limits would be restricted to lands of the government and these three parties.

The Breese property contains one short section of heavily wooded area which would be significantly affected by construction activities. This section is approximately 250 feet in length. The Smith property is generally open area and the conduit line would pass through two narrow tree lines. The Underwood property has one wooded section approximately 600 feet in length through which the conduit line is proposed. This section would be significantly affected by construction activities. The remainder of these private lands would not be significantly affected by the project. There are several small sections of wooded area on government land through which the conduit would pass. These sections total approximately 400 feet in length. In addition, a 600 foot wooded section exists which is on the fringes of the proposed 50 foot wide zone and which may be affected by construction activity. Table B compares total length of property affected to length of wooded property affected.

Construction through wooded areas will necessitate the removal of most trees now existing within the 50 foot wide zone. (Some latitude is available for preserving specific trees, depending upon size and exact location.) Therefore, the construction will have the undesirable long term effect of denuding these wooded sections, thereby disrupting the natural habitat and creating the potential for extensive soil erosion.

Construction through the remainder of the area within the park boundary, which is essentially free of wooded areas and which represents 85 percent of the total land, will have only a temporary adverse effect upon the land. This effect should be limited to the disruption of soil during the eight to ten month construction phase, and to the potential of minor soil erosion in some areas.

Neither the activities of the bulldozer nor the shovel have a great potential for harming creatures that have locomotive capabilities; however, the young of burrowing animals might suffer casualties. The wildlife will migrate from the immediate area during construction, but should establish nearby residence in most cases. The excavation will also expose the soil to potential erosional forces. The extent of the erosion will depend on slope, soil types and drainage patterns.

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TABLE B

PROPERTIES IN PISCATAWAY PARK BOUNDARY AFFECTED BY CONSTRUCTION

Owner	Total Length (ft) of Property Affected	Length (ft) of Wooded Property Affected
Breese	1,300	250
Smith	2,600	50
Underwood	1,650	600
U.S. Government	6,700	1,000

The project action will cause little problem in the fields crossed by the pipeline, since most of the fields, whether fallow or cultivated, are relatively flat and not prone to erosion. Additionally, the predominant vegetation is composed of annual grasses or crops which can be replanted or will reseed themselves, usually within one year. The excavation activity and the noise associated with it will dislocate some of the small burrowing animals, causing them to move elsewhere in the area, and a number of animal burrows will be destroyed.

2. People

The people living in the area will be subject to a number of inconveniences and irritants attributable to the project action. The increase in traffic from heavy-duty earth-moving and trucking equipment will damage the present dirt and gravel roads that are the principal means of access to the right-of-way, and will also damage to some extent the few blacktop roads that serve the area, particularly at turn-in and turn-out points. There will be additional concern on the part of the residents for their children in terms of the traffic problem and more importantly, the proximity of a 15 to 20-foot-deep trench that will exist during the course of the project. The construction activity will represent a new and interesting attraction to the children in the area, and even though the area is remote and sparsely populated, the potential for accidental injury will exist. In addition, the possibility of encountering rock outcroppings and the use of jackhammers for their removal exist. This would subject the inhabitants to the noise associated with the operation of this type of equipment.

3. Artifacts

There is also the possibility of encountering Early American Indian relics and artifacts during the excavation. This type of find has been made on the land within Piscataway Park. The nature of the construction activity inherently carries with it the potential destruction of some portion of those artifacts unearthed.

B. The Outfall Line

1. Excavation

Approximately 30,000 cubic yards of estuarial substrate will be removed and placed in barges during the dredging operation. The

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environmental impacts attributable to this excavation activity are as follows: (a) the removal of all benthic organisms supported by the estuarial substrate over an area of approximately 2 acres; and (b) the potential reduction the the aquatic quality of the estuarial waters in the vicinity of the dredging action that may occur due to increased turbidity and a reduction in the dissolved oxygen content of these waters. There is little possibility, if any, of solubilizing heavy metals contained in the sediments, since the material is lifted as found and placed in a barge.

The excavation activity will be within the view of visitors to Piscataway Park, The National Colonial Farm and Fort Washington on the Maryland side of the Potomac. Mount Vernon, as well as the strip of parkland that follows the banks of the river and George Washington Memorial Parkway on the Virginia side, will also be within view of the project site.

Visitors to Piscataway Park and the National Colonial Farm may be subject to the inconveniences of heavy equipment traffic and the existence of a temporary access road in the area. The noise attending the work, i.e., pile-driving and crane operation, will be audible and perhaps aggravating to some taking advantage of the noramlly quiet park area. To those using the recreational facilities at Fort Washington and the strip of parkland on the Virginia side of the river, only a visual and perhaps audible impact may be generated. Visitors to Mount Vernon, 2 1/2 miles below the site, almost surely will only be aware of the project when driving by it on the George Washington Memorial Parkway.

2. Disposal of Spoil

It is planned to transport the dredged material by barge upstream approximately 4 1/2 miles to the Dyke Marsh spoil disposal area, which may possibly be used under the auspices of the National Park Service, Department of the Interior, for such purposes.

The disposal operation can be viewed by visitors to the Fort Foote National Park, which is situated more than a mile across the river from Dyke Marsh. Also, users of the estuary for recreational and commercial navigation purposes may experience a visual impact.

C. Operational Impact

The proposed project action will generate potential environmental impacts that must be considered in the overall evaluation of the project. The operation of a pipeline inherently carries with it the possibility of leaks due either to faulty pipe connections, ruptured pipe walls for faulty manhole connections and/or accessories. Leakage would result in a discharge to the aquifer of a highly treated sanitary wastewater--a relatively desirable recharge situation. The impact here would be the unsightly soft ground condition in the vicinity that could develop before the leak was found. Explosion due to gas buildup is a remote possibility, particularly in view of the high degree of treatment that is anticipated. The possibility of developing an unsightly condition on the surface of the Potomac estuary is also unlikely, but does represent a potential aesthetic impact.

The impact of the effluent on the tidal marshes along the shore of the park is unknown. Dye tests conducted by WAPORA, Inc. in 1969 indicated that the effluent may, through tidal and other action, generally concentrate around Mockley Point and extend approximately one third of a mile into the Piscataway Bay.

The result of the effluent mixing with the river water is unknown. The potential impact of changing water quality, in turn altering the park's wetlands, will most likely be subtle and can only be determined through experience and careful monitoring of the operation. It can be assumed that the high quality of the tertiary treatment will have a diluting action on the solids in the Potomac River and the Piscataway embayment. The degree of this effect will of course, vary with the quantity and quality of the effluent.

IV. MITIGATING MEASURES

A. The Land Operation

A total of 20 acres of land will be completely cleared of its present vegetation. Seven acres are dense underbrush and woodland, and 13 acres are farmlands.

1. People

The inhabitants of the area will be subject to the noise generated, the dirt and dust raised, the increased traffic, the damage to existing roads and the increased exposure to accidental injury attending the construction work. These impacts are severe, but of relatively short duration. The existing drainage ditches, streams, roads and fences, where altered, removed, relocated or otherwise changed, will be replaced at their original location upon completion of the work. There will be some inconvenience associated with this activity, but its duration will be a relatively short period of time.

2. Plant and Wildlife

A naked scar will be left by the work for the period of time it takes for a sequence of plant colonization to take place. This phenomenon, known as "secondary succession", is a process which operates on any abandoned field, lot or disturbed area. It generally follows the sequence: bare ground to annual grasses and weeds to shrubs and saplings to forest. The various stages are not discrete, but overlap considerably and will eventually come to resemble the immature woodland now found in the area. During this vegetational succession, animal succession also takes place, and various species will appear and disappear, largely in response to vegetational changes. This represents the most highly visible impact.

In addition, there will be the loss of some 20 to 30 larger trees that are 20 or more years old. Completion of the project, followed by landscaping and planting, will make possible the replacement of these trees; however, the recovery time would be on the order of 15 to 25 years.

Upon approval of construction, a program of regeneration of affected wooded lands will be developed by WSSC, which would be compatible with the projected use of the Piscataway Park. This program will consist of the following:

a. Replacement of all trees of significance (i.e., greater than three inch DBH) on a one-to-one basis with a variety of species common to the immediate area and which range in size from 1 1/2 to 2 1/2 inch DBH;

b. Extensive planting of seedlings of various species;

c. Replanting of crops over the excavated sections which pass through agricultural areas.

d. Natural regeneration. During construction, qualified WSSC personnel will work directly with the contractor, and representatives of the National Park Service to preserve whatever trees are possible by appropriate marking, boxing and/or minor modification of the conduit center line.

e. In an effort to further eliminate the scar, no service road will be maintained along the line. If a foot/horse trail is required for maintenance and inspection, it might also be used for park visitors.

The loss of small game and wildlife will be minimal due principally to the existence of an identical habitat within 30 feet of the disturbed area. The noise that accompanies the land-clearing activity virtually assures the evacuation of burrows before they are destroyed by the action.

Estimation of the effects on the bird population of the proposed project action must take into account whether the birds are nesting, migrating or wintering. Migrating birds represent a minimum problem, since these birds can find other resting places for the few days involved. Based on the capacity of a healthy woodland with underbrush to support birds, the loss of 7 acres of land would deny perhaps 20 birds their nesting sites. This represents a minimal impact, since other sites are readily available within a very short distance. Wintering birds may tolerate the noise, and few might be forcibly displaced, since some of their food supply would be actually removed; this acreage corresponds roughly to about 11 birds in wintertime.

Furthermore, this displacement would only last for one season. As plants reinvaded the swath cut for the pipeline, other species of birds would be attracted. A benefit in terms of birds could be realized as a result of the clearing and recolonization activity caused by the project action. A phenomenon known as "edge effect" is known to occur where forest meets field; along this boundary (ecotone), wildlife populations frequently are in excess of those found within either the forest or the field.

The birds inhabiting the embayment and marshlands would possibly be disturbed only by the noise from the construction of the proposed pipeline. However, with respect to the ecosystem supported by the marsh area, the proposed project action could be expected to represent a long-term benefit when compared to the alternative of continuing the treatment plant discharge to the embayment.

3. Archeological Values

The possibility of unearthing American Indian cultural relics does exist. The nature of this impact is somewhat unusual in that realistically the prospective "find" would not have been made unless the proposed action were undertaken. The proposed alignment has been carefully selected to avoid known archeological areas. This alignment was based on the studies conducted by William M. Gardner of the Catholic University of America entitled Archeological Survey of Piscataway Park, Maryland, 1969. The 16,000-foot trench, is in effect, an extensive probe of the entire area that potentially provides the archeologist with the location of specific areas for further investigation. To further insure full consideration for potential archeological disturbances, a qualified archeologist will be retained to monitor the entire excavation process. In the event an archeological discovery is made, the work will be stopped until a determination is made as to its significance and appropriate course of action for its protection or excavation.

4. Soil Erosion

"Standards and Specifications for Soil Erosion and Sediment Control in Urbanizing Areas" is the standard procedure utilized by the Washington Suburban Sanitary Commission for soil erosion control. It is approved and adopted by the State of Maryland and was developed with the assistance of the U.S. Department of Agriculture. This procedure would be utilized during construction of this proposed action.

B. The Marine Operation

1. Water Quality

The impact from the dredging and disposal activity attending the proposed project action can best be assessed by comparison with a mining-type dredging activity associated with sand and gravel operations. The latter actually washes fines, silts, organic matter, clays and other undesirables from the

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excavated material, retains the sand and gravel, and deposits the "spoil" back to the watercourse. This spoil material is slow to settle and therefore exerts a degrading influence over a wide area by placing organic material into suspension. However, in the dredging operation associated with the project under consideration, the excavated sediments are deposited in essentially the same form as when they were removed for disposal. Dropping this material in water will subject it to a washing action, with some fine silt and organic material separating from the material as it drops through the water to the bottom. Turbidity will be developed in the area and degradation of aquatic quality will ensue. However, compared to the turbidity generated by a sand and gravel operation, the magnitude of water contamination is quite low. A high percentage of the water-soluble organic material present in the dredged material is not likely to be separated or go into solution, since the spoil will not be so finely divided as from a washing operation. The results indicate that there is no measurable increase in soluble heavy metals above normal background levels in the estuary that can be attributed to either the dredging or disposal activity. These findings make it possible to assess this potential impact as minimal.

2. Benthic Organisms

The 30,000 cubic yards of material involved in the proposed action constitute a low-volume, short-term disposal operation, subjecting the estuarial ecosystem to relatively minor impacts. The dredged area of approximately 2 acres will be void of any benthic organisms upon completion of the dredging. However, since undesirable sludgeworms very likely dominate in this substrate, it seems that the impact of this loss is minimal. This conclusion is given support by the following research findings. In the course of an investigation by WAPORA, Inc., of the rate of recovery of the benthos in a dredged area, a comparison of benthic organism density and species was made between an undisturbed substrate and that of a dredged hole that had been abandoned for approximately one year. This sampling site was at Greenway Flats, 3 miles below the proposed project action on the Maryland side of the estuary. The results of this comparison indicated a good rate of reinvasion by local species. It required only one growing season for the completely denuded areas to become colonized by species in the same ratio found in the undisturbed area and to attain about one-fifth their original population density. Another investigation completed by WAPORA, Inc. in the flats of Mattawoman Creek, supports the above findings. Here the dredged holes were filled in with sediment at the rate of 3 feet per year, and after 6 years

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these sediments supported a more abundant and diverse benthic population than the nearby undisturbed substrate. Using this data, the duration for complete restoration of the trench may be estimated as on the order of 3 to 5 years.

3. Fish

The estuary is used by several important species of fish for spawning purposes. Those aspects of the project action which must be considered for their possible effect on spawning activity include the noise and disturbance during construction activity, increased turbidity caused by dredging and disposal operations, and discharge of the effluent directly into the estuary. The noise and disturbance could be a factor if the area is a favored spawning site. It would be preferable if the dredging and construction in the estuary could be conducted at times other than April and May. However, since the important fish most likely to be affected spawn primarily at night, the impact will be minimized if operations are suspended from dusk until dawn.

Turbidity is not expected to be a problem; the estuary is naturally very turbid during the spring spawning season, and spawning activity does not seem to be impaired.

C. The Surrounding Area

1. Mount Vernon

The construction activity will occur within one and one-half to two and one-half miles from Mount Vernon. This will present some visual intrusion into the historic scene for which Piscataway Park was created to protect. To insure that this historic scene is not disturbed during the important Bicentennial celebration, no construction will occur during 1976.

2. Fort Washington National Park

The impact of the proposed activity will be substantially a visual and perhaps an audible one to which visitors to the Fort Washington Park will be subjected. Human nature being as inconsistent as it is, the impact generated by the observation of the activity attending the proposed action will vary from interested spectators to those who will object to the activity.

3. Fort Hunt National Park

The installation of the proposed outfall pipeline, considered from the Virginia side, is similar to that for Fort

Washington National Park. The estuary is approximately 1,400 yards wide at the location of the outfall. Therefore, a minimum of 1,000 yards of open water lies between the Virginia bank of the Potomac and the proposed action. That section of the bank within the view of the operation is a narrow, well-maintained park area about 4 miles long, situated between the George Washington Memorial Parkway and the bank of the Potomac. There are only two small parking areas that serve this strip of land without crossing the highway. One is located nearly directly opposite the site of the proposed action. To those visiting the area, the noise associated with the action will be audible perhaps on a very still day or on days when the wind is in a westerly direction.

This represents the major impact of the proposed action on the Virginia side of the river. There will be visitors who may be affronted by the sight of the action, and there will be those that will be interested in observing the activity and those who will not be aware of it. The wildlife in the area cannot be in any way affected by it. There are few if any residents along this stretch of the George Washington Memorial Parkway that will be able to view or hear the activity, since their homes are west of the highway; the additional distance and screening provided by the trees, which are well grown along the bank of the river and park area, will for the most part shield them from viewing or hearing the operations.

4. Fort Foote National Park

The 1 1/4-mile stretch of open water eliminates any impact from the disposal operation taking place in Dyke Marsh.

V. ADVERSE EFFECTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED

The major effect on park values is the visual impact of the construction activity. During this one year period, the noise, dust, damage to wildlife habitat and intrusion of modern equipment on the historic scene will be quite apparent.

The remnants of the construction activity in the form of a scar through wooded areas will remain for approximately 25 years. These scars will appear at 8 locations and will total 1900 feet in length. These scars will be seen by park visitors who are adjacent to them, but will not be seen by the general park visitor or those at Fort Washington, Mount Vernon, Fort Hunt or the George Washington Memoral Parkway in Virginia.

VI. RELATIONSHIP BETWEEN SHORT TERM USE OF THE ENVIRONMENT AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

Once the construction of the outfall line is complete and the revegetation process begins, the operation and maintenance of the proposal should have little effect on the park's resources. If, at some future time, the line is abandoned in favor of some other means of effluent disposal, the pipe would most likely remain in place.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITTMENT OF RESOURCES

Although the possibility of irreversible damage to unknown archeological resources does exist, every effort will be made to insure that this does not occur.

Other than the use of funds and manpower, no other resources are considered to be irretrievably committed to this proposal.

VIII. ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the crossing of parklands in the form of methods of disposal, pipeline alignments and discharge points are covered by the Environmental Protection Agency in other documents.

The only alternative alignment through the park which has been considered would traverse Federal lands. This would avoid those lands in private ownership within the park boundaries. This alignment would traverse 11,800 feet of Federally owned property from the southeast corner of the park to the point of entrance into the Potomac River bed. This would be 1300 feet longer than the proposal and would be within 200-500 feet of the Piscataway embayment. Ten thousand feet of this alignment would be within the 8' elevation flood plain of the Potomac River.

It would cross 4,000 feet of wooded area, 2,000 feet of which is swamp or marsh habitat. Marshes are a category of wetlands normally associated with fluctuating water levels as created by changes in tide. They can be either of the fresh, brackish, or salt water type. It has been well established that wetlands, and marshes in particular, are extremely valuable for several reasons. The most easily recognizable benefit of marshes is that they support very large numbers of water fowl, both migratory and residential. Marshes are favored nesting sites for many species of water fowl.

as well as terrestrial species, such as marsh wrens. They form favored feeding grounds for other species, such as the great blue heron, of which several were noted at Piscataway Bay in the spring of 1972. Some birds will build their nests directly in the wetlands, while others will construct nests in upland areas surrounding the wetland, attracted there by the proximity of the wetlands. The wetlands contain many plant species that are particularly desirable as wild fowl habitat and/or food, such as cattails, wild rice, spatterdock, waterlilies and a number of other species. Because of the presence of residential water fowl and the annual pattern of visitation of migratory water fowl, many hunters, of course, prefer to locate on or near marshes. Migratory species are attracted to marshes during their travels since they offer many benefits in terms of shelter and food value.

As well as the water fowl benefits of marshes, a great many species of small and large mammals are attracted to marshes because of food and hunting values there. Species such as otters, muskrats, racoons, deer and mice are known to frequent marshlands in search of either food, refuge or residence.

Another value of marshes which has come to be widely recognized in the past few years is that of their productivity. It has been shown that marshes are more productive in terms of organic material produced per acre than all but the most intensive agricultural practices such as sugar cane harvest. Various studies have shown that productivity per acre of marshland can be as high as three tons per acre, which is approximately three times as great as intensive midwestern corn production. The productivity of a marsh is based upon the organic assimilation which is engineered by the vascular plants and algae on the marsh itself. This is later partially transformed into animal material through being eaten by a multitude of snails, insects, crabs and birds. The plant material left uneaten will decay after a period of time (particularly during the winter when all the vascular plants die back to the ground) being decomposed by various bacteria and fungi and then transported by tide into the nearby water. This nutrient material in the water becomes available to shellfish as well as small crustaceans such as grass shrimp and copepods which exist in the waters nearby. These organisms are all part of a food chain which culminates in the water with fish such as the American shad and striped bass, which are of particular value in the Potomac River. The food stuffs and nutrients produced by the marsh are also utilized by bottom living or benthic organisms which are in turn also utilized by fish during their growth and adult phases. Since the marshes are largely covered by grasses and frequently flooded, they offer shelter for young fish or fry and are very often among the most important fish spawning areas to be found in an estuary such as the Potomac River.

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Finally, it should be noted that marshes and wetlands are unique habitats which can only be formed in estuarine or tidal situations such as exist in the Potomac River. Once destroyed through dredging, filling, or other of man's activities, they are irreplaceable and there have not yet been any successful attempts made to replace or recreate marshes. It has been calculated that since the arrival of man to the North American continent, marshes have been destroyed through construction, dredging, filling, or agriculture to the extent that perhaps less that 50 percent of those original marshes now exist. In the past 50 years, the eastern coast has lost all but a relatively small remnant of the marshes which originally existed there.

The impact of this alignment could have an irreversible effect on the 2,000' of marshland which it would cross. Not only would disturbance through siltation and construction activity occur, but the introduction of a pipe to this site could prohibit the marsh and swamp habitat from recovery.

An alternative to the one time installation of a 108" line is to construct more than one line in an incremental fashion which would serve the demand as it occurs. Initially a 54" line would serve the current proposal to treat 30 million gallons per day (mgd). Some time in the future one or two additional pipes could be laid on the same or new alignments. This would only be accomplished with the approval of the quantity and quality of the effluent by the Environmental Protection Agency. The disturbance of the park on a one time basis is less of an impact than the multi-pipe alternative.

It is assumed that the proposed 108" pipe may never be used to its capacity of 90 MGD. Increases in discharge quantities will only be made with permits from the Environmental Protection Agency.

Maryland Historical Trust
2525 Riva Road Annapolis Maryland 21401
(301) 267-5087

July 23, 1974

Mr. Richard L. Stanton
Associate Director
Cooperative Activities
U.S. Department of the Interior
National Park Service
National Capital Parks
1100 Ohio Drive, S.W.
Washington, D.C. 20242

Dear Mr. Stanton:

Following a review of all available data pertinent to the proposed upgrading and expansion of the Piscataway wastewater treatment facility in Prince Georges County, Maryland, we wish to make the following comments.

As you are aware the property area in question, that of the Piscataway Park, abounds in aboriginal sites. Many of these sites are known, recorded, and have been partially or wholly excavated. An equal number, however, are only known or suspected and have not been excavated or explored beneath the surface level. The majority of these prehistoric and historic sites believed to be the most significant are located in close proximity to the shore line and are primarily concentrated in the area of Mockley Point, Calvert Manor, and on the properties of John and Alexander B. Clagett near the site of the treatment plant itself. Some sites, such as the fort recorded by John Smith and the colonial village of John Ackelahama, last Emperor of the Piscataway Nation are now inundated as a result of geologic changes that have occured over the centuries.

The effect of the excavation and construction necessitated by the installation of the proposed effluence lines on historic structures recorded by this agency will be minimal. Since this will only be a temporary visual inconvenience it is not felt that such an encroachment is sufficient enough to warrant a request for a reexamination of the proposed routes. (For known buildings of historic interest in the area please see attached list and location map.)

In considering all of the factors involved we have concluded that the proposed route as recorded in the draft environmental impact statement of December, 1973, offers the least in the way of an adverse environmental impact, whereas the proposed alternate provides a greater

Historical and Cultural Administration
Department of Economic and Community Development

Attachment #1

likelihood of adversely affecting known archaeological and historic sites. We therefore approve the utilization of the first route, on condition that a trained archaeologist be available at all times in the event that any archaeological site is disturbed.

Thank you for considering us in this matter and for providing us with this opportunity to comment. We apologize for the delay in providing you with this material and are hopeful that it did not result in any inconveniences.

Sincerely,

J. Richard Rivoire
for
Arthur C. Townsend
Director

ACT:JRR:sh

Enclosures

cc: ✓Mr. Stephen A. Torok
Mr. J. Richard Rivoire

1. Early Clagett Farm - site of eighteenth-nineteenth century home of Clagett family, early settlers of region. Family cemetery located proximate to house site. House destroyed early twentieth century. Cemetery demolished early 1960's.

2, 3. Strawberry Hill - two story frame house dating from the second quarter of the eighteenth century and moved here from Charles County in mid-1960's. Present owner, A.B. Clagett, is fifth generation owner of house. Architectural integrity of building altered during reconstruction. House sits on site of circa 1600-1700 aboriginal settlement. Property in this area rich in artifacts.

4. F.A. Gardiner Store - early twentieth century (?).

5, 6. Mockley Point - Principal archaeological excavations made here. Building on point houses museum of artifacts discovered in this area.

7. Barn - nineteenth century.

8. National Colonial Farm

9. Site of early nineteenth century Bryan house

10. Locust Hill - home of O.N. Bryan, who carried out many late nineteenth century excavations and conducted research into prehistoric settlements within Piscataway Park area.

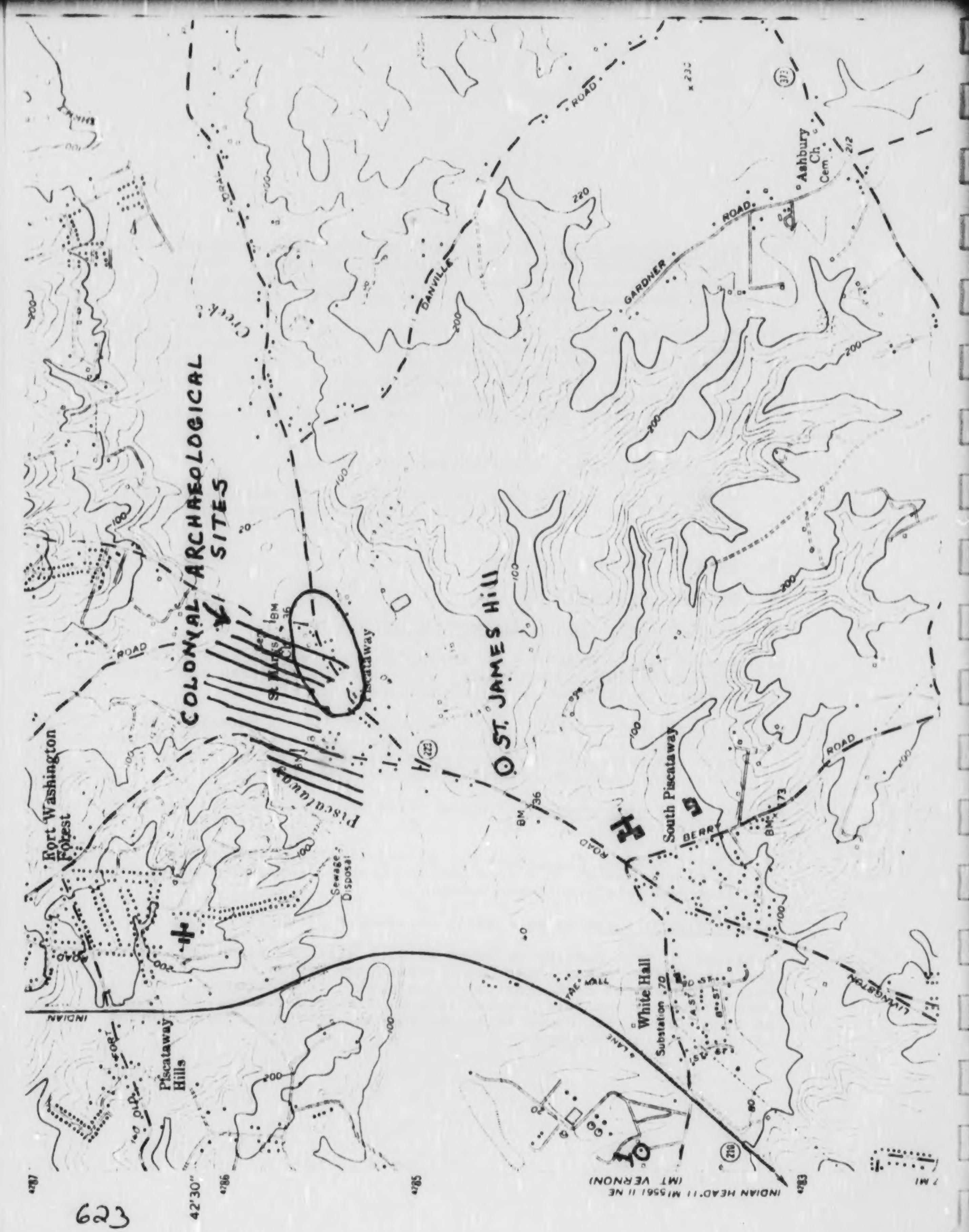
11. Marshall Hall, c. 1720. - House built by Thomas Marshall and of great importance to the study of Maryland's vernacular architecture. Marshall family cemetery adjacent dates from eighteenth and nineteenth century. Property now amusement park.

12. Henry Clagett property - house dates second quarter of the nineteenth century.

13. Christ Church, St. John's Parish - dating from seventeenth century is oldest parish in Prince Georges County. Existing church dates from the late eighteenth century.

14. William Clagett House - early nineteenth century.

Visitors to Fort Washington National Park will not find their view of the surrounding areas interrupted during the course of the proposed work. Properties of historical significance in the region, including Harmony Hall, Want Water (Lyles House), Piscataway House, St. John's at Broad Creek, St. James Hill, and Piscataway Village, will not be affected by this project.


COLONYAL ARCHAEOLOGICAL SITES
ST. JAMES HILL
Piscataway
St. Marys
Piscataway
Creek
Fort Washington Forest
Piscataway Hills
Sewage Disposal
South Piscataway
White Hall
Substation
Ashbury Ch
Cem
DANVILLE ROAD
GARDNER ROAD
BERRY ROAD
LIVINGSTON ROAD
INDIAN HEAD
FORT
OLD FORT ROAD
LANE
ROAD
223
210
373
BM 36
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4787
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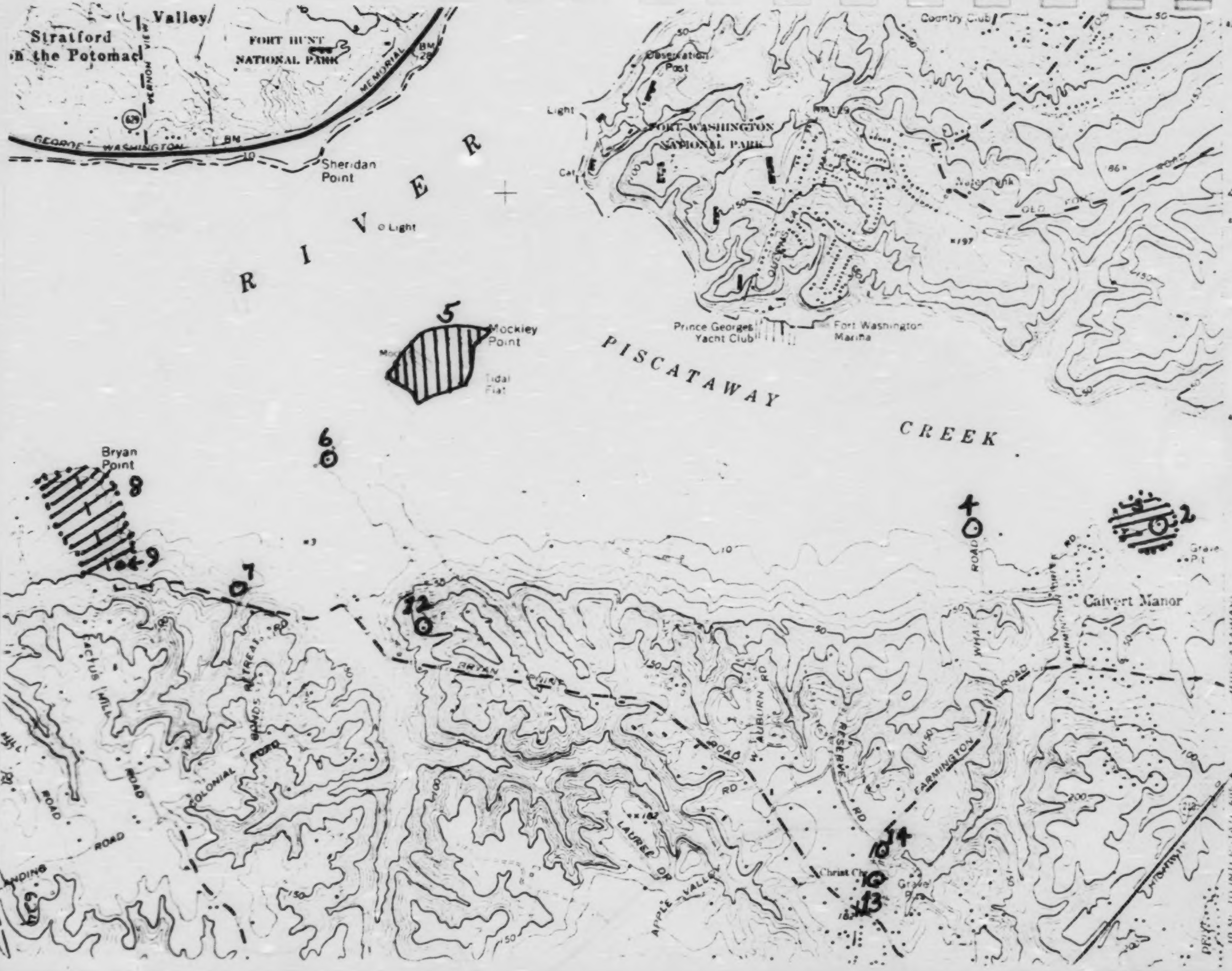
7 MI



Valley
Stratford on the Potomac
FORT HUNT NATIONAL PARK
MEMORIAL
GEORGE WASHINGTON
Sheridan Point
RIVER
Light
Country Club
Observation Post
FORT WASHINGTON NATIONAL PARK
Prince Georges Yacht Club
Fort Washington Marina
OLD FORT ROAD
Mockley Point
Tidal Flat
PISCATAWAY CREEK
Bryan Point
Calvert Manor
Gravel Pit
BRYAN POINT ROAD
AUBURN RD
RESERVE RD
FARMINGTON ROAD
WHARF ROAD
LAUREL DR
APPLE VALLEY
Christ Ch
Gravel Pit
CACTUS HILL ROAD
COLONIAL ROAD
SANDS RETREAT RD
LANDING ROAD
PISCATAWAY
10 MI. TO INTERSTATE 495
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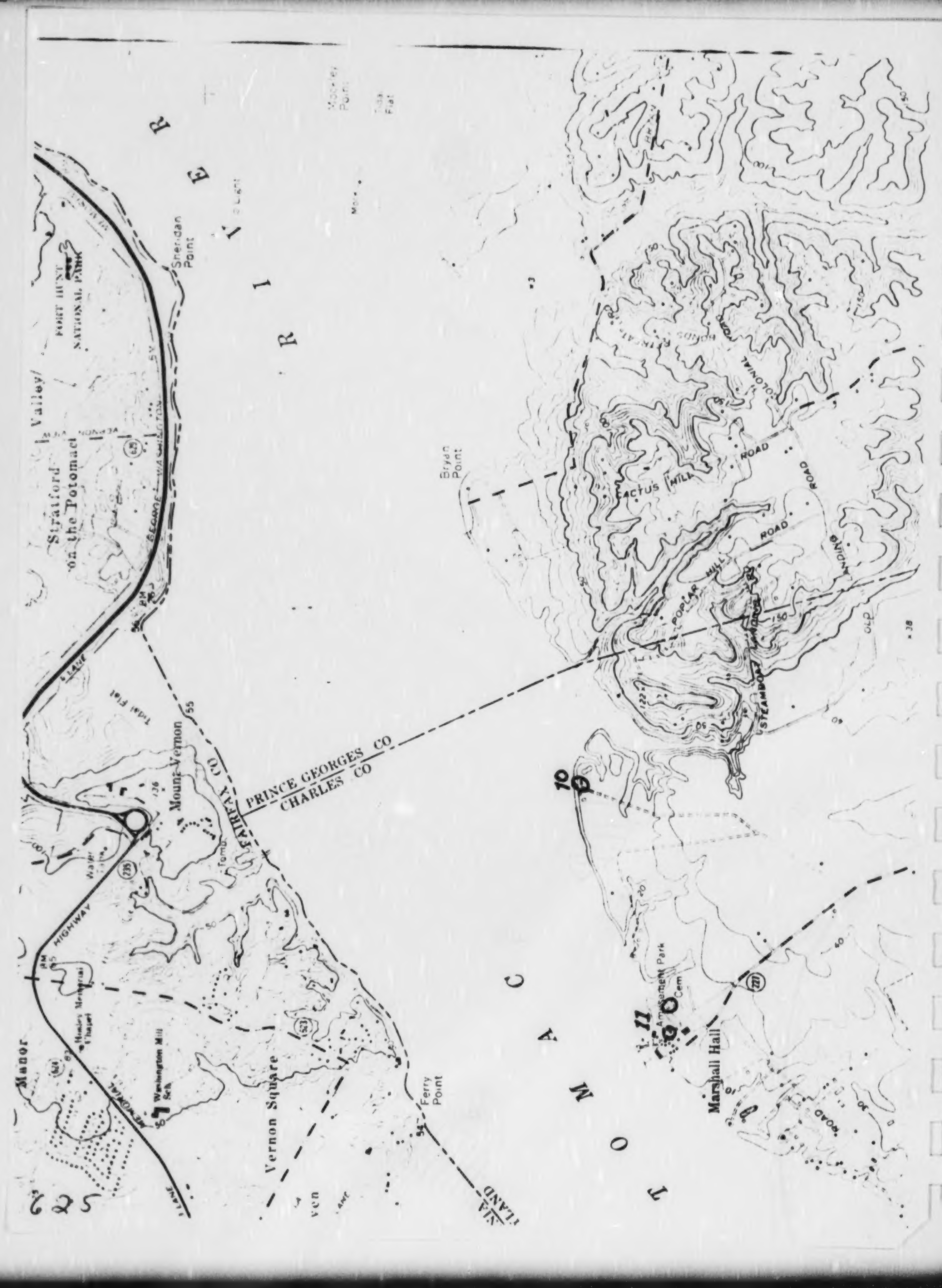

Stratford on the Potomac
Valley
FORT HUNT NATIONAL PARK
Sheridan Point
GEORGE WASHINGTON MEMORIAL PKY
HIGHWAY
Mount Vernon
Tidal Flat
Tomb
FAIRFAX CO
PRINCE GEORGES CO
CHARLES CO
Bryan Point
CACTUS HILL ROAD
POPLAR HILL ROAD
STEAMBOAT LANDING RD
OLD LANDING ROAD
COLONIAL
Marshall Hall
Amusement Park
Cem
Ferry Point
Vernon Square
Washington Mill Sch
Manor
Chapel
T O M A C
R I V E R
Tidal Flat
10
11
235
623
629
624
227

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Executive Director

221 GOVERNOR STREET
RICHMOND, VIRGINIA 23219
TELEPHONE 770 3143

VIRGINIA HISTORIC LANDMARKS
COMMISSION

2 July, 1974

Mr. Richard L. Stanton
Associate Director, Cooperative Activities
National Capital Parks
1100 Ohio Drive S.W.
Washington, D. C. 20242

Dear Mr. Stanton:

RE: Piscataway Wastewater Treatment Facility
Prince Georges County, Md.

Thank you for your letter about this project. We find that this project will have no adverse effects on any Virginia properties now listed on the National Register of Historic Places or on any properties which in the future may be eligible for the National Register.

Sincerely yours,

Junius R. Fishburne, Jr.
Executive Director

JRF:sk

pages 626 and 627
intentionally blank

Attachment #2

WASHINGTON SUBURBAN SANITARY COMMISSION
4017 Hamilton Street, Hyattsville, Maryland 20781 | 277-7700

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March 14, 1973

Mr. Russell Dickenson
Director
National Capital Parks
1100 Ohio Drive, SW Room 336
Washington, D. C. 20242

Attention: Mr. Dick Stanton

Dear Mr. Dickenson:

This is in response to a letter sent to you on February 26, 1973 by the Advisory Council on Historic Preservation in which Mr. Tapman requested a photograph and topographic map of the proposed sewer across Piscataway Park.

Enclosed is a letter to us from WAPORA Incorporated, our consultant, providing the requested items. As you know, WAPORA developed the "Environmental Impact Assessment for Piscataway Waste Treatment Plant to the Potomac River Estuary". The contents of their letter are self-explanatory and the material contained as enclosures should be responsive to the request of the Advisory Council.

If, after reviewing this material, you decide that an onsite inspection is indeed necessary, we shall immediately again stake the sewer line path to accommodate a field review as outlined by the Council. Mr. Walter A. Klein, our Director of Environmental Matters will act as our point of contact. He may be reached at 277-7700, Extension 575.

Meanwhile, please be assured of our desire to cooperate in response to any of your requests.

Sincerely,

David H. Elliott
Chairman

DHE/mg
Enclosures

Attachment #3

"Willing Water" — Symbol of Quality Service to the Suburban Maryland Area

WAPORA Inc. Research & Consulting in Pollution Control
6500 WISCONSIN AVE NW WASHINGTON D C 20015 PHONE (301) 652 9520

March 9, 1973

Mr. Cliff Hilton
Washington Suburban Sanitary Commission
4017 Hamilton Street
Hyattsville, Maryland 20781

Subj: Environmental Impact Assessment
for the Piscataway Pipeline
WAPORA Project No. G-12

Dear Mr. Hilton:

In accordance with the request from the Advisory Council on Historic Preservation dated February 26, 1973, WAPORA has conducted further topographic investigations for the subject project. Transmitted herewith are three copies of aerial photographs, USGS topographic maps, and profile graphs.

The aerial photographs were taken in 1972 by Photo Science, Inc., of Gaithersburg, Maryland. These photographs extend from the Potomac River in the vicinity of Mockley Point to the existing WSSC Piscataway plant. For your convenience, we have indicated the boundaries of the National Park as well as the construction corridor of the proposed pipeline on the photographs.

The enclosed topographic maps were used in determining the possibility of visual encroachment of the pipeline upon adjacent National Park areas. To fully evaluate this possibility, profiles were developed from the highest points at Fort Washington, Fort Hunt, Mount Vernon, and the National Colonial Farm, to two areas of the pipeline corridor where significant tree removal is required. A line of sight from the highest ground elevation to the pipeline location was then plotted from each National Park area. The lines of sight are indicated by dotted lines extending from assumed observation points to the ground above the pipeline. Observation points were conservatively selected based on the viewing level from various structures in the National Park areas.

Basically, the profile graphs indicate that the proposed project will not visually encroach upon the scenic view from any of the listed National Park areas. In the cases of Fort Washington, Fort Hunt, and Mount Vernon, only small trees and underbrush would be required to properly shield the pipeline corridor. Actually, the vegetation in the affected areas which would provide screening is mature with trees averaging 40 feet or more, and dense underbrush.

In the case of the National Colonial Farm, existing visual obstruction precludes visibility of the construction corridor.

We trust that this information will prove satisfactory. Please do not hesitate to contact us if we may be of further service.

Sincerely,

Edward F Bradley

Edward F. Bradley, P.E.
Director, Engineering Services

EFB:km

enc.

ADVISORY COUNCIL
ON
HISTORIC PRESERVATION

WASHINGTON, D.C. 20240

February 26, 1973

Mr. Russell Dickenson
Director
National Capital Parks
1100 Ohio Drive, S.W. Rm 336
Washington, D.C. 20242

Dear Mr. ~~Dickenson~~ Russ:

We have received the materials prepared by the Washington Suburban Sanitary Commission in response to your request of December 8, 1972, for supplemental data on the construction of a sewer outfall conduit across Piscataway Park, a National Register property. Unfortunately, these materials do not entirely satisfy our requests to you of November 21, 1972, because they do not enable us to ascertain the impact of the project upon the views from the surrounding historic properties of Mt. Vernon, Ft. Washington and Colonial Farm.

To expedite this matter, we suggest that an on-site inspection be held with representatives of the National Park Service, the Maryland State Liaison Officer for Historic Preservation, the Washington Suburban Sanitary Commission, the Environmental Protection Agency, and this office attending. At the time of this meeting, it would be most helpful if key points along the sewer line path were marked, perhaps with flags, so that we may assess the impact of the line upon the views from the historic properties.

Prior to such a meeting, may we also receive the materials previously requested: either an aerial photograph or a topographic map indicating the path of the sewer line, the boundaries of the National Register properties, and the trees to be removed for sewer line construction. The survey of such trees prepared by the WSSC is very detailed, but does not relate the loss of the trees to the views from the historic properties and is therefore of little assistance.

Upon receipt of the additional materials, we will be pleased to schedule this inspection at our mutual convenience.

Sincerely yours,

Ken

Ken Tapman
Compliance Officer

THE COUNCIL is charged by the Act of October 15, 1966, with advising the President and Congress in the field of Historic Preservation recommending measures to coordinate [illegible] private activities, advising [illegible] interest and participation, recommending the conduct of special studies, advising in the [illegible] of legislation, and encouraging [illegible] training and education. The Council [illegible] responsibility to comment on Federal [illegible] undertakings that have an effect on cultural property listed in the National Register.

cc: Stuart B. Schoenburg, Esq.
Murray Stein, Esquire
Hon. Charles McC. Mathias, Jr.
Hon. J. Glenn Beall, Jr.
Hon. Lawrence J. Hogan
Hon. Gilbert Gude
Hon. William Gullett
Hon. James P. Gleason
Hon. Winfield Kelley, Jr.
Hon. Dickran Hovsepian
Dr. Neil Solomon
Dr. Perry Stearns
Mr. Clayton Irvine

WASHINGTON SUBURBAN SANITARY COMMISSION

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General Counsel

January 16, 1973

Mr. Russell E. Dickenson
Director
National Capital Park Service
1100 Ohio Drive, S. W.
Washington, D. C.

In re: Permit for WSSC Effluent Line (WSSC vs. Rogers C. B. Morton, Secretary of the Interior, Civil 1487-71)

Dear Mr. Dickenson:

Pursuant to the letter of the Director, National Capital Park Service, dated December 7, 1972 there is submitted herewith a supplement to the Environmental Impact Assessment for Installation Of A Conduit To Transport The Effluent From The Piscataway Waste Treatment Plant to the Potomac River Estuary forwarded to the Interior Department on July 27, 1972. This supplement submitted by our consultants was compiled following a consultation with Interior Department personnel and is believed to contain the information sought by both the Interior Department and the Advisory Council on Historic Preservation.

The Commission is ready to implement the modifications and realignment mentioned in the supplement and our personnel will work closely with Park personnel during the construction to insure that the impact on the environment is kept to its absolute minimum.

You will note that the assessment indicates that it would take 8 to 10 months to install the conduit across the land to the Potomac River and the same length of time to construct the line from the shore of the Potomac to its terminal point in the river. These periods can run concurrently, of course, and it is our intention to construct them concurrently.

I trust that this is the information you seek in order that you may promptly process our request for the permit for the effluent line. If you require anything further, please let me know what you require and I will see to it that you obtain it with all dispatch.

Very truly yours,

J. Eugene Cleary

J. Eugene Cleary
Staff Counsel

JEC:sr
Enclosure

6 34

WASHINGTON SUBURBAN SANITARY COMMISSION
ENVIRONMENTAL MATTERS
INTER-OFFICE MEMORANDUM

TO: WHOM IT MAY CONCERN

FROM: DIRECTOR OF ENVIRONMENTAL MATTERS

DATE: SEPTEMBER 3, 1973

SUBJECT: PISCATAWAY CONDUIT TO THE POTOMAC RIVER

By letter dated December 7, 1972 the Director of National Capital Parks requested on behalf of Mr. Ken Tapman, Compliance Officer of the Advisory Council on Historic Preservation, certain materials by which the impact of the project can be ascertained relative to the views from surrounding historic properties of Mount Vernon, Fort Washington and Colonial Farm. An aerial photograph and topographic map were also desired. On February 26, 1973, Mr. Tapman reiterated this request and WAPORA, Inc., a consultant retained by WSSC, developed for Mr. Tapman a package of material including a USCGS map and aerial photograph of the subject alignment and a profile of sitings from Fort Hunt, Fort Washington and Mount Vernon. This package clearly showed that the impact was negligible and was not visible from any of the aforementioned historic locations. The subject package was delivered to Mr. Tapman at a meeting jointly attended by Mr. Tapman, NPS (Mr. John Parsons), WSSC (Messrs. Stapp and the undersigned) and by WAPORA, Inc. (Mr. Ed Bradley). This meeting took place during late March 1973. Mr. Tapman was pleased with what the package of materials showed and withdrew his request to walk the line.

Subsequent to this meeting during August 1973, based upon a June-July analysis, a minor modification in the alignment enabled WSSC in response to a NPS request to place the conduit on the edge of a pasture land in lieu of a moderately wooded side hill in the vicinity of ~~Bryant~~ WHARF Road. In short, the minimal degradation has been further decreased and the results are now final.

WAK/dt

Walter A. Klein

Walter A. Klein

WASHINGTON SUBURBAN SANITARY COMMISSION

4017 Hamilton Street, Hyattsville, Maryland 20781 | 277-7700

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General Counsel

December 19, 1973

Mr. John G. Parsons
Chief, Division of Urban Project
Coordination and Environmental Impact
National Park Service
National Capital Parks
1100 Ohio Drive, S.W.
Washington, D. C. 20242

Dear Mr. Parsons:

This is in reply to your letter of November 26, 1973 regarding your concern about excavating below the water table and the disposal of dredge material, reference the Piscataway conduit project.

First, I am enclosing a letter from WAPORA, Inc. our consultant for the Assessment of Environmental Impact on the Piscataway effluent conduit. Their letter addresses both the ground water and dredging problems. As you can see, both of these problems can be reconciled.

Concerning the ground water, in addition to the WAPORA letter, I am enclosing a copy of our latest approved environmental specifications and a copy of the WSSC Sediment Control Permit for Utility Construction. The Environmental Specifications will be published in time for inclusion in the subject contract. The Specifications are already being enforced as written. Publication remains, in essence, a formality. As you can see, the permit delineates 17 requirements, all applicable to the conduct of excavation at Piscataway. The project site represents a very clean and routine type environment. The ground water should not be a serious consideration. The transient nature of the excavation task should negate the need for a sediment basin. Pumping and dispersing water in sheet flow across pasture and farm type land is commonplace and poses no problem. As a matter of fact, furrowed land is particularly suitable for dispersing water. In summary, the impact is negligible. As stated in the WAPORA letter, should any shallow well be influenced by our excavation, the WSSC will take corrective action in respect to such a claim. These considerations are part of the reason why core borings were not taken on the land portion of the project.

The dredge spoil problem is more significant. Several alternatives remain open for consideration. One alternate is offsite disposal as outlined by WAPORA. Another involves a cooperative effort with the National Park Service whereby excavation spoil from the overland route might be employed as dike material behind which the river bottom dredge material might be placed. A third alternate is the use of Dyke Marsh should the National Park Service finances materialize. A fourth alternate also being considered is to allow the contractor in his bid to provide an approach of his own to the disposal problem. This permits innovation and individual response. In any case his disposal area will have to meet Federal, State and local specifications. In short, the subject remains open, and we want to cooperate in any way that we can to meet all requirements.

Finally, it is suggested that if these matters remain of critical concern to the National Park Service, that the Department of Natural Resources be requested to provide on-site professional inspection personnel for the duration of the project. This would insure that the environment is protected by an external agency. This suggestion should show that we intend for our work in National Park Service property to be of the highest standard possible.

I hope this letter and our consultant's analysis are responsive to your concern. If any questions remain unanswered, we shall be glad to meet with you immediately.

Sincerely,

Walter A. Klein

Walter A. Klein
Director of Environmental Matters

WAK/dt
Enclosures-3

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WAPORA Inc. Research & Consulting in Pollution Control

6900 WISCONSIN AVE N.W. WASHINGTON D C 20015 PHONE (301) 652-9520

December 13, 1973

Walter S. Klein
Washington Suburban Sanitary Commission
Director of Research & Development
4017 Hamilton Street
Hyattsville, Maryland 20781

Dear Mr. Klein:

As you requested in our recent meeting, we have reviewed the letter from the United States Department of Interior dated November 26, regarding a request for additional information on the proposed Piscataway Effluent Conduit. Basically, this letter requested clarifications as to disposal of ground water from the pipeline trench, and disposal of dredge material and oil from construction of the pipeline into the Potomac Estuary.

Construction Methods and Disposal of Ground Water Seepage

The construction of pipelines in low-lying areas adjacent to water courses is typical and routine in the Washington Metropolitan Area. Most trunk sewers follow main stream contours and are placed at or below ground water table elevation. The proposed Piscataway pipeline parallels the Piscataway embayment and is offset by approximately 600 feet except for the final portion of the line. The final section, extending for approximately 2,000 feet, will likely have significant amounts of ground water intrusion which must be dealt with.

We discussed the ground water problem with Mr. Jon DeGrott, of the United States Soil Conservation Service; Mr. Fred Mack, of the United Stated Geological Survey; and Mr. Arnold Schiffman, of the Maryland Geological Survey. They indicated to us that all drilled wells in the area are set in deep water-bearing formations at the 200-600 foot level. Usually, the aquifer utilized is the Aquia formation. It is anticipated that the only wells which could possibly be affected by this work would be "dug" wells in the immediate area of the pipeline. No such wells are on record. In any event, it is our understanding that the WSSC will deepen and repair any wells affected by the work at no charge to their owners.

The aforementioned experts also indicated to us that the geology of the area is such that the line will pass variably through clayey and sandy deposits and the amount of ground water present will vary accordingly. Of course, larger quantities of ground water for disposal would be expected in those areas of sandy soil.

Discussion with WSSC construction personnel and the WSSC consulting engineer for this project, David Volkert & Associates, indicate that there will be no permanent pilings or reinforcement in the pipeline trench. The shoring of the trench during construction will be accomplished using a "steel meule," which is a steel frame that is set in the trench and dragged forward as the job proceeds. This not only eliminates a need for conventional shoring but also minimizes the amount of open trench at any one time.

A review of the equipment for erosion and sedimentation control guidelines as outlined in the WSSC Environmental Specifications Section 1-24 and the WSSC "Application for a Sediment Control Permit for Utility Construction"," show that discharge of sediment-carrying streams to natural water courses is expressly forbidden. These specifications require the provision of sedimentation basins, French drains, or treatment of pumped ground water with floculating chemicals to avoid physical/chemical degradation of surface waters where required. You have indicated to us that this specification will be strictly enforced by the WSSC Environmental Department. Disposal of pumped ground water carrying low silt content can best be accomplished by spreading and percolation over immediately adjoining areas. However, should silt content become elevated, presedimentation before spreading is suggested. If quantities of ground water exceed assimilatory capacity for percolation of neighboring areas, the ground water should be settled and clarified using floculating chemicals and/or portable treatment equipment prior to discharge to any one of the ten intermittent streams crossing the route of the pipeline. It is quite possible that much of the ground water will be disposable on the surface as the area is neither marshland nor inundated. In fact, the adjacent area to the pipeline route is pastureland which should percolate water readily.

To conclude, we would not anticipate any major environmental problems associated with the construction of the pipeline through areas in which ground water will intrude into the construction trench. Care must be taken, however, to avoid discharging pumped ground water carrying silt into local streams. It is suggested that ground water borings and core analyses along the pipeline route be taken prior to initiation of construction and that a construction program which will minimize ground water intrusion and disposal be outlined and written in the bid specification. Permit to perform such boring will, of course, be required from the Department of Interior, National Park Service.

Disposal of Dredge Spoils-

A review of our files pertinent to the Piscataway pipeline project indicates that very little evaluation of alternatives of disposal of dredged spoils was carried out due to a tentative commitment from the National Park Service to provide Dyke Marsh as a dredge spoil disposal area. It is our understanding of the situation at this time that the Environmental Protection Agency has required the National Park Service to provide special non-pervious dikes around the marsh prior to disposal of dredge spoils. Due to budgetary limitations, it is now unlikely that the National Park Service can have Dyke Marsh prepared to receive dredge spoil in time for construction of the Piscataway pipeline.

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Due to the nature of the park limits and adjoining residential areas along the pipeline corridor, it is unlikely that such dredge material can be disposed of on the adjoining land. Thus, you have informed us that, if Dyke Marsh is not available, the WSSC will remove such dredge spoils to outside disposal areas and/or alter construction methods to vary the quantity and quality of material to be disposed of. In any case, the material will not be disposed of on any National Park land or scenic easement areas nor will such material be disposed of in view of any such areas. Possibly it would be to the benefit of both the WSSC and the National Park Service to explore means of providing the necessary dike material around Dyke Marsh so that the WSSC could utilize this area for silt disposal. This approach would certainly be environmentally sound, as it would allow filling of dredge sand and gravel areas in Dyke Marsh with material indigenous to the area. In addition, this approach might minimize WSSC expense and energy consumption in the completion of the pipeline project, while assisting the National Park Service in reclaiming the Dyke Marsh area.

Mr. Klein, we trust that the above comments will be adequate to allow continued evaluation of this project. We will be most happy to invesigate in detail and make recommendations on specific mitigating measures for the handling of ground water and the disposal of dredge fill. Obviously, such detailed evaluation will require sufficient soil boring data along the pipeline route and an area survey and evaluation of possible dredge spoil disposal sites. Please let us know if you will require these services. Also, don't hesitate to contact me if there are any further questions.

Sincerely,

D. H. Houck

Daniel H. Houck
Director, Environmental Assessment

DHH:lrr

United States Department of the Interior

NATIONAL PARK SERVICE
NATIONAL CAPITAL PARKS
1100 OHIO DRIVE SW.
WASHINGTON, D.C. 20242

IN REPLY REFER TO:
L7619-NCP(CUPE)

NOV 26 1973

Mr. Walter A. Klein
Director, Environmental Matters
Washington Suburban Sanitary Commission
4017 Hamilton Street
Hyattsville, Maryland 20781

Dear Mr. Klein:

We are in the process of working with Region III of the Environmental Protection Agency in the preparation of an environmental impact statement for the expansion of the Piscataway waste water treatment facility. Our involvement in this impact statement relates to the impact on park values of the alternative of laying the 108-inch effluent line across Piscataway Park. In reviewing your environmental assessment, we find that two critical areas have not been addressed.

As we understand the construction, the invert of the 108-inch pipe would not be less than 13 feet below existing grade. Due to necessary excavation we assume that the depth of the trench would average about 15 feet. Approximately 3,000 feet of the line will lie underground sloping from elevation 30 to elevation 10 and below. The ground water in this area is at about elevation of 5 to 8. With this understanding we are concerned as to how the excavation below the water table will be accomplished. We assume that large volumes of water will occupy the trench and will, in turn, have to be pumped out. We feel we must address ourselves to the volumes and area required to dispose of this water. We will also need to address ourselves to the construction methods such as piles or cribbing.

We would also like to point out that the tentative standards for the filling of Dyke Marsh require erection of dykes around the areas to be filled. These dykes will have to be constructed of rock, gravel, and other material which will be placed under the inspection of EPA. At the present time, the Park Service is not in a position to guarantee that these dykes will be available for disposal of the material from this project. Have any other alternatives for the disposal of the dredge material been considered?

Please call me if any clarification of these points is required.

Sincerely yours,

John G. Parsons
Chief, Division of Urban Project
Coordination and Environmental Impact

ADDENDUM

DEPARTMENT OF NATURAL RESOURCES WETLAND REPORT AND RECOMMENDATIONS

CASE NO. 72-WL-0022

BACKGROUND

The applicant, Washington Suburban Sanitary Commission, has requested that the wetland license issued for the construction of the Piscataway effluent line in the Potomac River be amended to provide for dredging operations between August 1st and March 1st rather than November 1st and March 1st as previously approved. The applicant contends that the more restricted period would occasion delay in completion of the works.

DISCUSSION

The Fisheries Administration has reviewed and approves the request. Spawning of anadromous fish occurs during the period March 1st to August 1st. Dredging should not be undertaken during that period.

RECOMMENDATION

It is recommended that the wetland license be amended to provide for dredging operations to be restricted to the period August 1st to March 1st.

Herbert M. Sachs
for the Secretary of Natural Resources

7/4/79
Date

HMS:mw

Attachment #5

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
6TH AND WALNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

SEP 5 1974

Mr. Herbert M. Sachs, Director
Water Resources Administration
Tawes State Office Building
Annapolis, Maryland 21401

Dear Mr. Sachs:

The Washington Suburban Sanitary Commission (WSSC) has informed me that a combination of construction prohibitions may delay completion of the Piscataway Effluent Outfall Line until mid-1978. These prohibitions surround the National Park Service's (NPS) restriction on construction activities in the Piscataway area which would affect the view from Mount Vernon during the Bicentennial Year, and State restrictions on dredging operations in the Potomac Estuary during the period of March 1 through November 1. The latter restriction serves to avoid interference with the migratory, spawning, and feeding activities of various important sport and commercial fish species. In addition, WSSC has indicated that approximately four to five months will be required to construct the proposed effluent outfall line.

Having been notified of these restrictions and the possible delay in completing the effluent outfall line, this office requested NPS to entertain WSSC's request for a relaxation of the Bicentennial Year construction constraint during the 1975-76 period, thereby allowing the effluent outfall line to be completed two years earlier than would otherwise be possible. In reply, the NPS has recently indicated that they would be amenable to relaxing the construction restriction through the month of January 1976, but not beyond.

Because of the timeframe involved to complete the outfall line and since the State's policy prohibits WSSC to begin dredging prior to November, it is our understanding that WSSC will shortly be requesting a revision to their Wetlands License to allow construction on the outfall line in early September of 1975. This action will enable WSSC to complete construction of the line two years earlier.

I trust that you can appreciate the large monetary savings and environmental benefits which would result from completing construction two years earlier, and hope that you will permit WSSC to begin construction in September 1975.

It would be most helpful if you would give me your opinion of how your agency will respond to this two-month request, the resultant impacts of construction during September and October, and what mitigative measures could be taken to reduce these impacts. Should you desire to discuss this further, I can be reached at 215-597-9430.

Sincerely Yours,

Greene A. Jones

Greene A. Jones
Director
Air & Water Programs Division

cc: Mr. McKewen

United States Department of the Interior

NATIONAL PARK SERVICE
NATIONAL CAPITAL PARKS
1100 OHIO DRIVE SW.
WASHINGTON, D.C. 20242

IN REPLY REFER TO:
D24-NCP(CUCE)

JUN 20 1974

Mr. Greene A. Jones
United States Environmental
Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Jones:

This is in response to your March 28 letter concerning the potential delay of construction of the Piscataway Effluent Outfall Line. We would like to clarify the position of the Park Service relating to the potential disruption of the view from Mount Vernon during the construction phase of the proposed project.

Piscataway Park was established primarily for the protection of the view from the Mount Vernon estate in Virginia. The mission of the Park Service is to maintain a rural setting similar to that existing during the colonial period. As the Bicentennial Year will draw thousands of visitors to Mount Vernon, it is our objective to ensure that Piscataway Park is not disturbed by construction equipment or other disturbance to the agricultural scene. Our concern also extends into the Potomac River. Although the river is not under our jurisdiction, we feel that an operating dredge or other construction equipment within view of Mount Vernon would indeed be unfortunate during this high visitation period.

In reviewing the criteria outlined in your letter, we see no reference to the actual time requirement for construction within the riverbed. It would seem to us that the dredging of 40,000 cubic yards of material could be accomplished between November and December of 1975. If more time is required for this operation, we may consider extending our permit into January of 1976.

I can assure you that our permit will prohibit vehicles from the historic areas during the remainder of 1976, as it will be imperative to have agricultural crops in production during that year.

Sincerely yours,

John A. Townsley

[Acting] Director, National Capital Parks

ENVIRONMENTAL PROTECTION AGENCY

MAR 28 1974

Mr. Richard Stanton
Assistant Director
National Capital Parks
National Park Service
1100 Ohio Drive, SW
Washington, D.C. 20242

Reproduced from best available copy.

Re: Piscataway Effluent Outfall Line

Dear Mr. Stanton:

The Washington Suburban Sanitary Commission has informed me that a combination of construction prohibitions may delay completion of the Piscataway Effluent Outfall Line until mid-1978. The National Park Service has indicated that construction may not proceed in the Piscataway area during the Bicentennial Year, while State regulations confine dredging operations in the Potomac Estuary to the period of November 1 through March 1. The latter regulation serves to avoid interference with the spawning of anadromous fish.

A construction sequence analysis has shown that if underwater construction were permitted during the first two months of 1976, the line could be completed prior to March 1, 1976. A relaxation of the National Park Service prohibition during this two-month period of low visitation could thus allow the line to be completed two years earlier than would otherwise be possible. We feel that this action would be environmentally preferable to operating during the spawning season.

I trust that you appreciate the large monetary saving which would result from completing construction two years earlier, and hope that you will permit WSSC to continue construction during January and February, 1976, should the need arise.

CONCURRENCES

MBOL	[illegible]	3AF	A+W					
NAME	[illegible]	B						
TE		3/28/74						

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It would be most helpful if you would give me your opinion of how the National Park Service will respond to this two-month request. Should you desire to discuss this further, I can be reached at 215 597-9430.

Sincerely yours,

Greene A. Jones
Director
Air and Water Programs Division

cc: Clifford A. Hilton, WSSC

bcc: Walt Klein - WSSC
Mike Crean "
Dan Geller

L.Teller:bab 3-27-74
EIS - Piscataway

CONCURRENCES

SYMBOL								
SURNAME								
DATE								

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APPENDIX K

MISCELLANEOUS

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
6TH AND WALNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

SEP 12 1974

Mr. Thomas D. McKewen, Director
State of Maryland
Department of Natural Resources
Tawes State Office Building
Annapolis, Md. 21401

Dear Mr. McKewen:

In our letter of August 28, 1973 we authorized you to increase the allowable capacity of the Piscataway Sewage Treatment Plant from 15 to 17 mgd with the following stipulations:

1. The increase would allow the transfer of 5 mgd of sewage in the Henson Creek drainage area from the Blue Plains Plant to the Piscataway Plant. The average daily flow through the Piscataway Plant at the time was 12 mgd.
2. A water quality monitoring study would be conducted when the Piscataway Plant's throughput exceeded 15 mgd. This study would be made to determine the effect of the increased flow on the embayment area.
3. If the above study indicated a water quality degradation beyond current levels, then the transfer of the 5 mgd from Henson Creek would be discontinued.
4. The final decisions on allowing the requested 20 mgd discharge to the embayment would be deferred pending the outcome of the water quality monitoring study.

The water quality monitoring study has been completed. Data gathered after the average daily flow exceeded 15 mgd has been compared with data obtained when the average daily flow was 12 mgd or less.

The results of the study indicate that the allowable average daily flow could be increased to 20 mgd with no appreciable detriment to the embayment. These investigations also reveal that an average daily flow beyond 20 mgd could cause serious water quality problems in the embayment.

K'1

Based on the above, the flow of the Piscataway Sewage Treatment Plant can be increased to 20 mgd with the following stipulation:

> That the Piscataway Sewage Treatment Plant accept the sewage flow from the west side of Andrews Air Force Base not to exceed 1.75 mgd as specified in the Utilities Service Contract between the Department of the Air Force (Andrews Air Force Base) and the Washington Suburban Sanitary Commission.

Should you have further questions, please let me know.

Sincerely yours,

for Daniel J. Snyder, III
Regional Administrator

Copy to:
Dr. Solomon, Md. Dept of Health & Mental Hygiene
Paul McKee
Tom Downs
Colonel Bell, AF

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
6TH AND WALNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

D.G

AUG 28 1973

Mr. Thomas D. McKewen
Director
State of Maryland
Department of Natural Resources
Tawes State Office Building
Annapolis, Maryland 21401

Dear Mr. McKewen:

We have reviewed your request to increase the current allowable discharge for the Piscataway sewage treatment plant to the Piscataway Embayment from 15 mgd to 20 mgd. This requested increase in allowable discharge would enable approximately 5 mgd sewage flow from the Henson Creek drainage to be transferred from the Blue Plains STP to be treated at the Piscataway facility. This increase would permit the current discharge of approximately 12 mgd be increased immediately to 17 mgd with another 3 mgd to be reserved for future planned growth.

We concur with your request subject to the following conditions:

1. The effluent discharged to the embayment be initially restricted to 17 mgd consisting of the current 12 mgd plus 5 mgd transferred from the Henson Creek drainage area.

2. Continuous water quality monitoring studies of the embayment are to be undertaken by EPA and the State of Maryland.

Rec'd
p.3!

3. If the monitoring studies show a water quality degradation beyond current levels, the transfer of 5 mgd from Henson Creek will be discontinued.

4. The final decision on allowing the full 20 mgd discharge to the embayment will be deferred pending the outcome of the water quality monitoring study.

Staff of the EPA Chesapeake Support Laboratory are currently conducting an intensive field investigation of the water quality conditions in the embayment. This field work will continue to monitor the water quality conditions in the embayment as the effluent loadings increase. It is our understanding that sewage flows from Andrews Air Force Base will be treated at Piscataway STP if the results of the field investigations do not show degradation of the embayment.

If you have any questions concerning this position, do not hesitate to contact me.

Sincerely,

Daniel J. Snyder III

Daniel J. Snyder, III
Regional Administrator

cc: Dr. Solomon
Paul McKee
Tom Downs

bcc: S. Wassersug
R. Rhodes
J. Galda
W. COlony ✓
B. Lacy
H. Longest
G. Gardner

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MGMPHAT HSB
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ZIP 19106

western union Mailgram

US ENVIRONMENTAL PROTECTION AGENCY AP
6TH AND WALNUT STS
PHILADELPHIA PA 19106

THIS MAILGRAM IS A CONFIRMATION COPY OF THE FOLLOWING MESSAGE:

2155979814 TDMT PHILADELPHIA PA 46 03-26 0527P EDT
FON 3012777700
WASHINGTON SUBURBAN SANITARY COMMISSION, MGM XTD
4017 HAMILTON ST
HYATTSVILLE MD 20781
DEAR SIRS,

THE US ENVIRONMENTAL PROTECTION AGENCY REQUESTS THE TERMINATION OF INCINERATION OPERATIONS AT YOUR PISCATAWAY PLANT PENDING A PRINCE GEORGE'S HEALTH DEPARTMENT EVALUATION OF REPORTED HIGH BLOOD LEAD LEVELS IN A FEW AREA CHILDREN AND THE RESULTS OF RECENTLY COMPLETED EPA STACK TESTS.

DANIEL J SNYDER III REGIONAL ADMINISTRATOR US ENVIRONMENTAL PROTECTION AGENCY

17:27 EDT

MGMPHAT HSB

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4-30-74

TELEGRAM

SUBJECT: PISCATAWAY INCINERATION

FROM: DANIEL J. SNYDER, III
REGIONAL ADMINISTRATOR, REGION III

TO: WASHINGTON SUBURBAN SANITATION COMMISSION

ON MARCH 26, 1974 WE REQUESTED, VIA TELEGRAM, THAT YOU CEASE INCINERATION AT THE PISCATAWAY SEWAGE TREATMENT PLANT PENDING EVALUATION OF TEST STUDY DATA. PRELIMINARY DATA FROM STACK TESTS AT PISCATAWAY INCINERATORS INDICATE A VERY LOW LEVEL OF LEAD EMISSIONS AND THEREFORE AN EXTREMELY SMALL PROBABILITY OF ASSOCIATED HEALTH EFFECTS. IN ORDER TO GATHER DATA FOR A COMPLETE ENVIRONMENTAL ANALYSIS OF BOTH STACK EMISSIONS AND AMBIENT CONCENTRATIONS, WE CONCUR WITH YOUR SUGGESTION THAT INCINERATION FOR TESTING PURPOSES AT THE PISCATAWAY FACILITY BE RESUMED.

K3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
6TH AND WALNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

Washington Suburban Sanitary Commission
4017 Hamilton Street
Hyattsville, Md. 20781

Dear Sirs:

On March 26, 1974 we requested, via telegram, that you cease incineration at your Piscataway plant pending evaluations from several studies. At this time, we would like to rescind our request and suggest that incineration be continued. The reasons to support our present recommendation are the following:

1. Initial findings by the Prince George's Health Department have disclosed no unusual concentrations of lead in the local environment. Similarly, blood lead levels have been found to be lower than anticipated at first. Most of the lead in the area appears to be generated by the combustion of gasoline in automobiles.
2. Preliminary findings from stack tests on the Piscataway incinerator, performed by EPA in February, 1974, indicate that emissions of lead are low (ca. 4 grams/day) and that at this level no health effects danger exists. EPA is doing further analytical work on the samples obtained during the testing.
3. In order to fully substantiate the EPA testing results, a comprehensive long-term testing program would be beneficial. The proposed Battelle Laboratories effort requires the operation of the incinerator for approximately six months to permit accumulation of data.

4. Similarly, the University of Maryland study on ambient pollutant concentrations and related health effects requires about a nine month period of incinerator operation.

Since further operation of the Piscataway incinerator for test purposes will not pose a threat to human health, incineration can proceed. Data resulting from further incineration should resolve the question as to the magnitude of the environmental impact of sludge incineration.

Sincerely yours,

Daniel J. Snyder, III
Regional Administrator

Health Department
prince george's county
cheverly, md. 20785
773-1400
perry stearns, m.d.
health officer

TO: THE BOARD OF HEALTH and COUNTY EXECUTIVE

FROM: Dr. Perry Stearns, Health Officer

RE: Piscataway Sewage Treatment Plant / Lead concerns

DATE: May 28, 1974

The Health Department recognizes everyone's anxiety to resolve community concerns that originated back in March when two children from the Piscataway area were reported to have elevated blood lead levels. We are just as anxious as everyone else because our primary responsibility is to safeguard the health of the community. If there is a problem---or a possible problem---we want to find it and do something about it.

Thus, we have never seen ourselves in an adversary position in relation to the community's concern. Instead we have viewed this as an opportunity to evaluate lead as a factor in the quality of life throughout the County, for our research has shown there are other communities with higher lead concentrations in the air than Accokeek.

As the County Health Officer, I am frankly pleased to see citizens express their concerns about our environment and possible threats to it and to the public's health. In this instance, citizen concern has uncovered the fact that there are no lead standards on sludge incinerators or municipal incinerators. It has revealed that suburbia, as well as the cities, must be concerned about possible lead threats. This is highly commendable and certainly in the best interest of the public.

At the same time, this situation has pointed up the limits of our capability to respond to citizens' demands as quickly as they might like.

It is two months since you charged this department and the Washington Suburban Sanitary Commission to look into possible health hazards in the Piscataway area. This boils down to 43 working days. During that period we have mounted a very thorough and responsible study of the situation in Piscataway, but I must admit we could not have done so six months ago because we had no epidemiologist.

As you know from our budget, we do not maintain a staff of health professionals just waiting for emergencies to crop up. We are chronically understaffed. Every employee has regularly assigned duties and none can be diverted from these on a full-time basis over a sustained period of time. We have no statisticians, no computers, no laboratory facilities capable of doing blood lead tests or chemical breakdowns of air filters.

We have been very dependent on other agencies to provide us with information and supportive services. Some have responded rapidly and wholeheartedly; some, for various reasons, have not.

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At each step we have shared our findings with you and the general public, but until we have all the pertinent data and have time to analyze it, we cannot give you as complete a report as you are seeking. Nor can we draw final conclusions, although as far as we know, there are no persons with elevated blood lead levels in the Piscataway area. Thus, the original stimulus for looking into a possible health hazard in that community no longer exists.

Since our last report to you on April 16, we have proceeded with additional blood testing and environmental sampling in order to establish a solid base line of data.

ENVIRONMENTAL STUDIES

1. Another group of ten Hi Vol Air Filters from the Accokeek monitor was submitted to a different laboratory than analyzed the first group. This second batch was analyzed for lead content by the State Health Department using the atomic absorption method. The results were similar to the first group of 11 filters analyzed by the University of Maryland. This gives a total of 21 samples from the air monitor at the Eugene Burroughs Junior High, downwind of the Piscataway Sewage Treatment Plant.

Date	First Sample Lead Concentration (ug/m^3)	Date	Second Sample Lead Concentration (ug/m^3)	
1-10-73	0.25	1-16-73	0.21	
2-9-73	0.32	2-27-73	0.45	highest
3-11-73	0.10	3-23-73	0.18	
4-22-73	0.12	4-10-73	0.07	
5-4-73	0.13	5-16-73	0.19	
6-3-73	0.32	6-9-73	0.13	
7-3-73	0.12	7-9-73	0.21	
8-8-73	0.20	8-20-73	0.11	
8-26-73	0.38	9-7-73	0.14	
3-24-74	0.16	2-22-74	0.03	lowest
3-27-74	0.28			

EPA is currently considering establishing an ambient lead level standard of 2.0 micrograms per cubic meter of air on an annual average.

2. Attached is a statement, marked No. 1, from the EPA office of Air Quality Planning and Standards, regarding samples it took Feb. 20-21 from the exhaust gases at the incinerator.

This states, "The results indicate that if all three incinerators were operating, the total lead emissions would be four grams a day." This would result in a maximum annual average ambient lead concentration of 0.0021 micrograms per cubic meter of air, 50 meters north of the incinerator, EPA estimates.

We are still waiting for EPA to furnish us with a mass balance that would show what goes into the incinerator, what comes out and where the balance goes. We have also asked to see their raw data sheets, which would include information about several metals, including lead.

WSSC, as you know, has planned for Batelle Columbus Institute to do extensive testing of the incinerators, but this cannot occur until they are in operation long enough for the studies to be undertaken.

The University of Maryland has also been contracted to conduct downwind and upwind studies two weeks prior to and at intervals after the incinerator is started up again. Included in its study will be a mass balance. The University will use more sophisticated techniques and equipment than the Health Dept. has available.

Dr. Philip Landrigan of the U.S. Public Health Service has stated that since the incinerator has only operated 73 hours, its emissions cannot account for any important fraction of the lead presently in the blood of children living near it.

3. Staff members have continued their search for other emission sources that might affect the Piscataway community. Possible contamination from airplanes or industries located outside the County were investigated, along with automobile traffic and air flow patterns.

Preliminary results to date indicate that the overwhelming lead insult to the community is probably leaded gasoline from automotive sources. 11,000 vehicles per day travel Rt. 210 north of Rt. 373 and give off about 3.42 lbs. of lead per mile each day. 31,000 vehicles per day travel Rt. 210 south of Oxon Hill Rd. and give off a total of 9.62 lbs. of lead per mile each day.

From the information we have at this point, it would seem that children living near the highway are at greater risk from a lead insult than those living near the incincerator.

4. Dust fall buckets were placed at Eugene Burroughs Jr. High and at the Hyattsville library in order to compare what is falling out of the air in two different areas of the County. The air monitor tells what is suspended in the air; the dust bucket what is falling out; in other words, fine particulate matter vs. the larger particulate matter. Results are pending.

5. A total of 12 sludge samples, taken between August, 1973 and April, 1974, have been analyzed by EPA, the University and the State Health Department. The lead content does vary, but this is expected due to change in seasons, rainfall and other factors. All are within the expected range for lead content in domestic sewage sludge.(See U. of Md. report, marked No. 2)

6. Attached are the results of soil, dust and water samples taken at three different times. (See sheets marked No. 3)

It is a fairly involved procedure to differentiate between the natural component of lead in soil near the surface and lead contamination. Since lead stays near the surface, soil samplings must be taken at precise depth levels up to about a foot and a half. The soil type at each sample location must be determined at a soils laboratory. Nearby sites in the same area with the same soil types can have greatly differing lead profiles.

According to Dr. Landrigan, dust is a more important vector than soil. Without the diluting effect of the earth, lead particles in household dust can build up to higher concentrations than those commonly found in soil.

The highest vacuum cleaner dust sample we found was 302 parts per million (ppm), which Dr. Landrigan considered well below the lead level expected from vacuum cleaner dust. Later samples from the same house were lower; however, houses A and B (the original households concerned) do show much higher lead in their vacuum dust than does house C, located in the same vicinity.

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The highest lead content in these households was found in fireplace ashes. This might be due to burning newspapers or chemicals, such as those which create colors in the fire. It is known that House B, which registered 1125 ppm in its fireplace ashes on March 29, had used chemical powders. All of its later samples were much lower in lead content.

Blood Lead Survey-Preliminary Results

1) Retesting Results- Families A and B

The children of families A and B underwent repeat blood lead tests on 3/30 and 4/22 (Table 1). The retesting revealed normal lead levels. As the USPHS has recommended as a diagnostic criteria of undue absorption of lead, either past or present, that a blood lead concentration of 40 mcgms or more per 100 milliliters of whole blood, determined on two separate occasions, be considered suggestive. Since the repeat tests on these children performed at two and five weeks respectively were within normal limits, this diagnostic criteria has not been met. Therefore one cannot make a diagnosis of undue lead absorption in any of these children.

As for the original levels noted, consultants in the field have offered several explanations.

A) Contamination. The finger prick screening test is the best one currently available for determination of lead levels. It does however yeild a certain number of false positives due to contamination in the collection and/or processing of the specimens.

B) Massive Ingestion. In cases of massive ingestion blood lead levels will rise sharply and fall off sharply as the body rapidly excretes lead. For example, a thumbnail size paint chip can contain 50,000 mcgms of lead, and could produce blood lead elevations within 24 hours after ingestion.

C) Stress. Elevations such as noted occur in children during periods of stress, as in illness, fever, dehydration, etc.

D) It has been stated that given the normal ingestion of lead from food (about 300 mcgms/day), and assuming air was the only environmental agent involved, lead concentration of 8 - 10mcgms/m³ of air, 24 hours a day, 7 days a week, for 3-4 months would be required to produce elevated blood levels such as first noted in these children. An incinerator which operated over a period of 3 months, on 10 separate days, for a total of 72 hours, with an estimated emission of 4 grams per day, could not have produced the levels noted.

2) Testing Results- WSSC Employees

The majority of lead particles are known to fall out within .20 kms of their emission source. The greater part of the area within 1 km of the incinerator is uninhabited, except for the WSSC employees, Accordingly 43 men working in and around the incinerator building were tested for both blood lead levels and hematocrits. The hematocrit is a measure of the volume of packed red blood cells. In adult males the normal levels are 47 ± 5. Part of the lead in the bloodstream is bound to the red blood cells. Anything contributing to an increase or decrease in circulating red blood cells will be reflected in an increase or decrease in blood lead levels.

The average Blood lead level of these 43 employees was 24.33 mcgms% with a range of 13 - 42. Only one individual showed a blood level over 40, ie. 42 mcgms %. This person also had an hematocrit of 45.

A repeat examination of this individual revealed a lead level of 40 mcgms %, with a hematocrit of 50. Dr. Hick's of Children's Hospital feels the elevated levels are a reflection of the elevated hematocrit. The underlying medical reason for the elevated hematocrit is as yet unknown.

3) Results of Private Testing

On April 16th the Health officer received the results of blood lead tests performed privately on 37 individuals, (9 adults and 28 children), living in the vicinity of the WSSC plant. (Table 3) The tests were performed at five different labs, and in 3 cases, the performing lab is unknown. Twenty-two of the tests were by venapuncture, 12 were by fingerprick, and 3 were by an unknown method. The mean blood lead level was 17.5 mcgms %, with a range of 7-28. These levels are comparable to those done in similar studies in the United States. A breakdown of these results by age reavealed a mean for adults of 14.5 with a standard deviation of 4.35 and a mean for children of 20.4 with a standard deviation of 4.98. The difference is statistically significant. In other studies in the U.S., children have shown higher levels than adults in the same area. There was a marked difference in performance among the laboratories utilized. The difference among laboratories is also well known and only a few submit to or met the quality controls established by the Communicable Disease Center.

4) Lead Survey Results

Two surveys were undertaken to determine the lead levels of children in Piscataway. The first survey was conducted on April 8th. Bloods from 81 randomly selected children living in the Piscataway Election District were collected by fingerprick test, and submitted to the MD State Lab (Group 1). The general population in the election district is clustered to the S-SW and to the N-NE of the plant, with the greatest clustering being to the N-NE. These residential patterns were reflected in our sample of children. These children lived from 1 to 9 kms (.6 - 5.4 miles) of the plant. Specimens from a second group of 77 randomly selected children living within 2 kms (1.2 miles) of the plant were collected on May 11th.(Group 2) Information as to age of house, duration of residence, school attended, grade teacher was obtained on each child. Location and direction of the home in relation to the WSSC Incinerator, and Indian Head highway was obtained by examination of the tax assessor's files and maps

Analysis of the data. Preliminary

The mean blood lead level among the children of Group 1 was 16.83 mcgms % with a standard deviation of 5.894, and of Group 2 was 14.597 with a standard deviation of 2.964. It is to be noted that blood levels such as these have been reported from various studies of suburban children throughout the United States. In a recent review of the literature on this topic, Lin-Fu states that "the mean blood lead level of the urban population without undue lead uptake, expressed in mcgms %, is between the teens and lower twenties, the upper limit of normal should be no higher than 40mcgms and may actually be lower."

2) There was no correlation between blood lead levels and distance from the incinerator in either Group 1 or Group 2.

3) There was no correlation between blood lead levels and distance from the Indian Head Highway in either Group 1 or Group 2

4) There was no correlation between blood lead levels and age in either Group 1 or Group 2

5) There was no significant difference between mean blood lead level and school attended.

6) Means of both Group 1 and Group 2 were within normal limits observed in suburbia; However the mean of Group 1 was 2.24 mcgms higher than that of Group 2.--a statistically significant difference but a small one. Further analysis of the data by age and sex revealed that males in the 10-14 year old group of Group 1 accounted for the difference in mean blood lead levels noted between Group 1 and Group 2.

7) Further breakdown of blood lead levels in Group 1 revealed that the highest levels were observed on those bloods drawn within the first hour of the clinic on April 8th. Males were in a preponderance during this hour. To be noted also is the fact that it was during this hour that the normal clinic procedure was disrupted by the intrusion of unscheduled candidates for blood lead tests.

COMPARISON OF BLOOD LEAD LEVELS
FAMILIES A + B.

MEMBER	AGE	DATE OF TEST		
		3-14-74①	3-30-74②	4-22-74
SR	3	34	18	23
JR	7	43	22	24
BR	8	45	18	21
DW	7	38		15
KW	8	39		20

① Test by fingerprick - Hospital 1

② Test by venepuncture - Hospital 2

TABLE 2

BLOOD LEAD LEVELS - WSSC EMPLOYEES

RANGE OF BLOOD LEAD LEVEL - MCGMS%	NUMBER OF EMPLOYEES
10 - 14	1
15 - 19	5
20 - 24	18
25 - 29	13
30 - 34	4
35 - 39	1
40 - 44	1

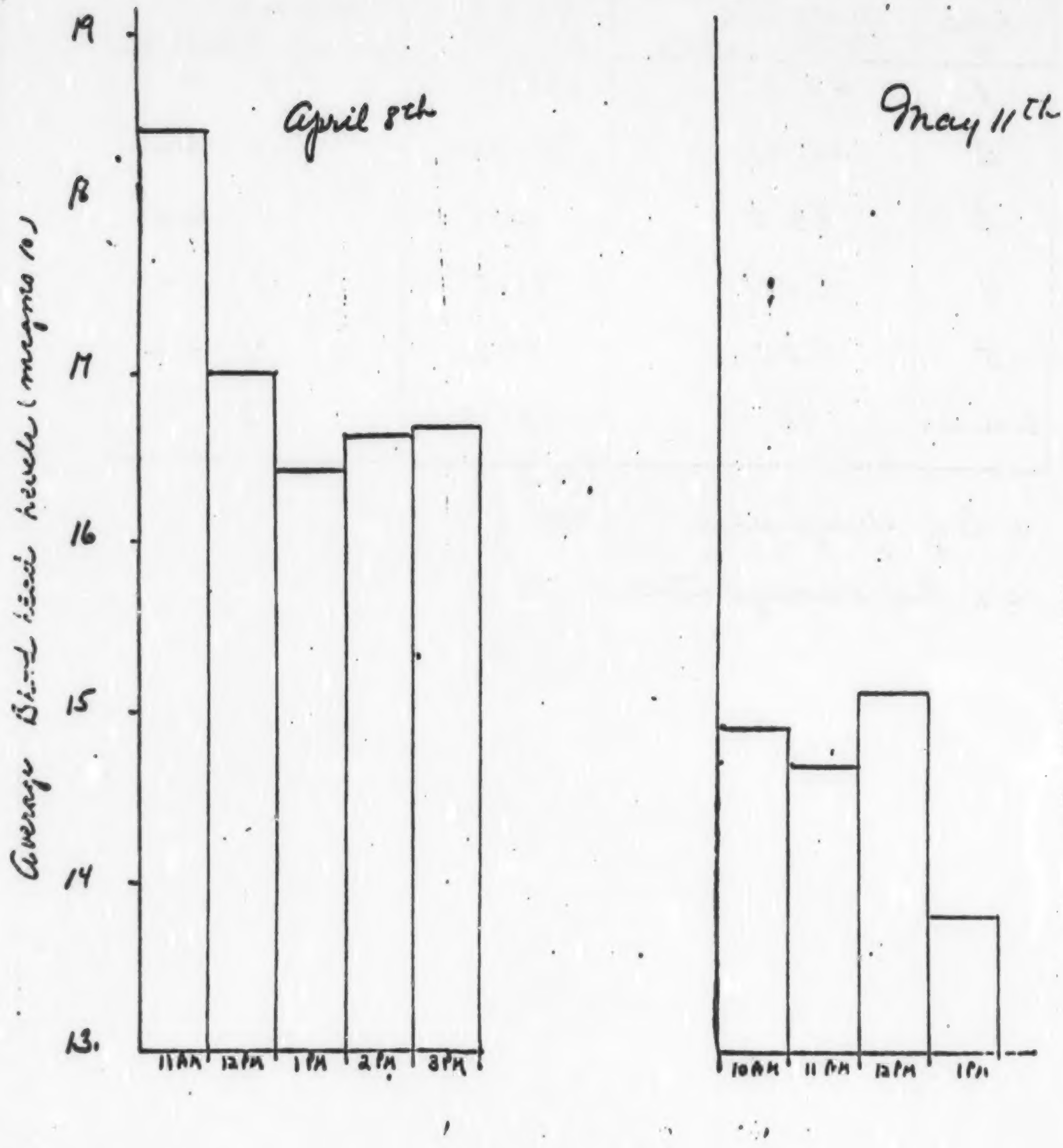
Average Blood Lead Level = 24.33.
Range 13 - 42

BLOOD LEAD LEVELS BY PERFORMING LAB
PRIVATE TESTING - MARCH 1974

LAB #	BLOOD LEAD AVERAGE- MCGMS%	RANGE MCGMS %	NUMBER OF SPECIMENS
1	22.07	15-28	12 *
2	20.71	18-25	14 **
3	13.5	13.5	1 **
4	12.3	9-15	3 **
5	9.25	7-12	4 **
Unknown	18	17-19	3

* By fingerprick

** By venapuncture


April 8th
May 11th
Average Blood Lead levels (micrograms %)
19
18
17
16
15
14
13.
11AM
12PM
1PM
2PM
3PM
10AM
11AM
12PM
1PM

POPULATION & HOUSING INFORMATION
PISCATAWAY & SURROUNDING AREA

ELECTION DISTRICT	LAND AREA SQ. MILES	POPULATION JAN 1970	POPULATION JULY 1970	POPULATION JAN 1971	POPULATION JULY 1971	POPULATION JAN 1972	HOUSING UNITS JAN 1970	HOUSING UNITS JULY 1970	HOUSING UNITS JAN 1971	HOUSING UNITS JULY 1971	HOUSING UNITS JAN 1972
Piscataway	51.60	16,600	17,100	17,300	17,700	18,600	4,400	4,600	4,500	4,500	5,000
13. CT	51.60	16,600	17,100	17,300	17,700	18,600	4,400	4,600	4,600	4,800	5,000
13. 01	24.42	3,200	3,200	3,300	3,600	4,000	900	900	900	1,000	1,100
13. 02	11.54	2,300	2,300	2,300	2,300	2,300	600	600	600	600	600
13. 03	7.72	3,000	3,500	3,600	3,700	4,100	900	1,100	1,100	1,200	1,300
13. 04	7.92	8,100	8,100	8,100	8,100	8,200	2,000	2,000	2,000	200	2,000

#1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SUBJECT: Piscataway Sewage Sludge Incinerator - Lead Emissions DATE: [illegible]

FROM: B. J. Steigerwald, Director
Office of Air Quality Planning and Standards

TO: Daniel J. Snyder, III
Regional Administrator, Region III

We collected samples from the exhaust gas from the Piscataway sewage sludge incinerator during February 20-21, 1974. The samples were analyzed by NERC-RTP personnel for lead content, and the results indicate that if all three incinerators were operating, the total lead emissions would be 4 grams per day. This is based on the average of three samples collected from one of the incinerators. The individual sample results are 1.423, 1.407, and 1.158 for an average of 1.330 grams per day. Based on all three incinerators operating, the emissions would be 4.269, 4.221, and 3.474 for an average of 3.990 grams per day.

Using information in the December 1973 draft of the Environmental Impact Statement on the Piscataway incinerator, we estimated that lead emissions of 4 grams per day would result in a maximum annual average ambient lead concentration of 0.0021 micrograms per cubic meter. This estimated concentration would occur 50 meters north of the incinerator.

I hope that this information will be helpful to you. If you have any questions or need additional information, please feel free to contact me.

cc: R. Strelow
G. Jones, Region III
D. Bliss
D. Shearer
R. Proctor, USPHS
D. Goodwin
J. Farmer
D. Walters
D. Geller

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#2

Preliminary Values for Concentrations of Zinc, Manganese Magnesium, Iron, Cadmium and Lead in Sewage Sludge

J. J. Bors, A. T. Zander, W. Arcola and W. H. Zoller
Department of Chemistry
University of Maryland
College Park, Maryland 20742

Samples of seven sewage sludges from the Piscataway plant and one from the Parkway plant were analyzed in this laboratory for several metals. Samples were dried for two hours at 110°C, then refluxed for 1 hr in 15 ml of conc. HNO_3. Following this, 3 ml of 70% $HClO_4$ was added, and the excess HNO_3 slowly distilled. Distillation was continued for some time after the appearance of fumes of perchloric acid to ensure the complete destruction of organic matter. All determinations were done by atomic absorption. These values are considered preliminary, pending spot-checks by other analytical methods (e.g. instrumental neutron and/or photon activation analysis).

In interpreting these results, it should be kept in mind that all are reported on a dry weight basis, giving values 5 to 10 times higher than on a wet basis. For comparison, other sewage sludges have been found to have concentrations as high as 10,000 μg/g Zn and 1000 μg/g Pb (R. L. Mitchell, "Trace Elements," in Chemistry of the Soil, F. E. Bear, ed.).

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PRELIMINARY RESULTS - PISCATAWAY AND PARKWAY SLUDGE SAMPLES

Sample Date and Description	Wet Wt. g	Dry Wt. g	Solids %	Metal Content, ug/g of dry weight					
				Zn	Mn	Mg	Fe	Cd	Pb
3-3-74 Piscataway filter press 1	1.0388	0.1765	16.2	917±46 905±45	900±45	2593±259	(5.31±.26)10⁴ (4.87±.24)10⁴	50±5	612±
3-4-74 Piscataway S-935	1.0841	0.1652	15.5	820±41 791±40	773±39	2782±278	(4.73±.24)10⁴ (4.52±.23)10⁴	12±4	524± 438±7
3-5-74 Piscataway	1.0339	0.1628	15.7	909±45 897±45	878±44	2641±264	(5.08±.25)10⁴ (5.52±.28)10⁴	11±5	507± 656±6
4-5-74 Piscataway 4:25 a.m.	1.9225	0.2047	10.5	839±45 835±43	899±45	2672±134	(4.61±.23)10⁴	16±5	242±4
4-8-74 Piscataway 8:30 a.m.	2.2519	0.4925	21.7	770±38	772±38	2863±143	(4.26±.21)10⁴	7.5±2.2	425±4
4-8-74 Parkway 2:00 p.m.	1.9453	0.2217	11.4	2467±123	224±22	3067±153	(1.51±.08)10⁴	24±7	767±7
4-9-74 Piscataway 9:30 a.m.	1.6353	0.3357	20.5	900±45	906±51	2874±144	(5.00±.25)10⁴	9.5±2.8	435±4
4-10-74 Piscataway 9:05 a.m.	1.7891	0.3126	17.5	889±44 908±45	829±89	2717±136	(5.47±.27)10⁴	10±4	553±5

#3

On April 3, 1974, soil samples were collected around the incinerator building of the Piscataway Wastewater Treatment Plant and within a radius of one mile of the plant.

Sample results are as follows:

Sample No.	Location and Source	Lead Content
1.	Piscataway Drive and Piscataway Court.......top soil	17 ppm
2.	Piscataway Drive and Pine Road..............top soil	15 ppm
3.	13800 blk. of Piscataway Drive..................top soil	24 ppm
4.	Marshy area south of 13800 blk. of Piscataway Drive....top soil (composite)	20 ppm
5.	Boat ramp facility at Leonard Calvert Drive....top soil	30 ppm
6.	Around incinerator of Piscataway Treatment Plant 50-100 ft. from building.......top soil (composite)	13 ppm
7.	Meadow along Rte. 210 at the Mall, about 10 ft. from shoulder of road...... ....top soil	133 ppm ✓
8.	Bank of stream north of Rte. 210 and Farmington Road at least 150 ft. away from shoulder of road...top soil (composite)	12 ppm
9.	Woodland along Rte. 210 at stream near Farmington Road, about 15 ft. from shoulder of road...... ....top soil	85 ppm
10.	White Hall Ave. & Ayer St.......top soil	30 ppm
11.	Meadow and Woodland at 14900 blk. of Schall Road.........top soil (composite)	73 ppm
12.	Woodland south of end of April Street...........top soil	[illegible] ✓
13.	Woodland south of Livingston Road at Llewellyn Dr.........top soil	10 ppm
14.	South end of Wannas Drive... top soil [illegible]	

On March 29, 1974, the following samples were collected from the residences of A and B of Piscataway Drive, and from their immediate surroundings:

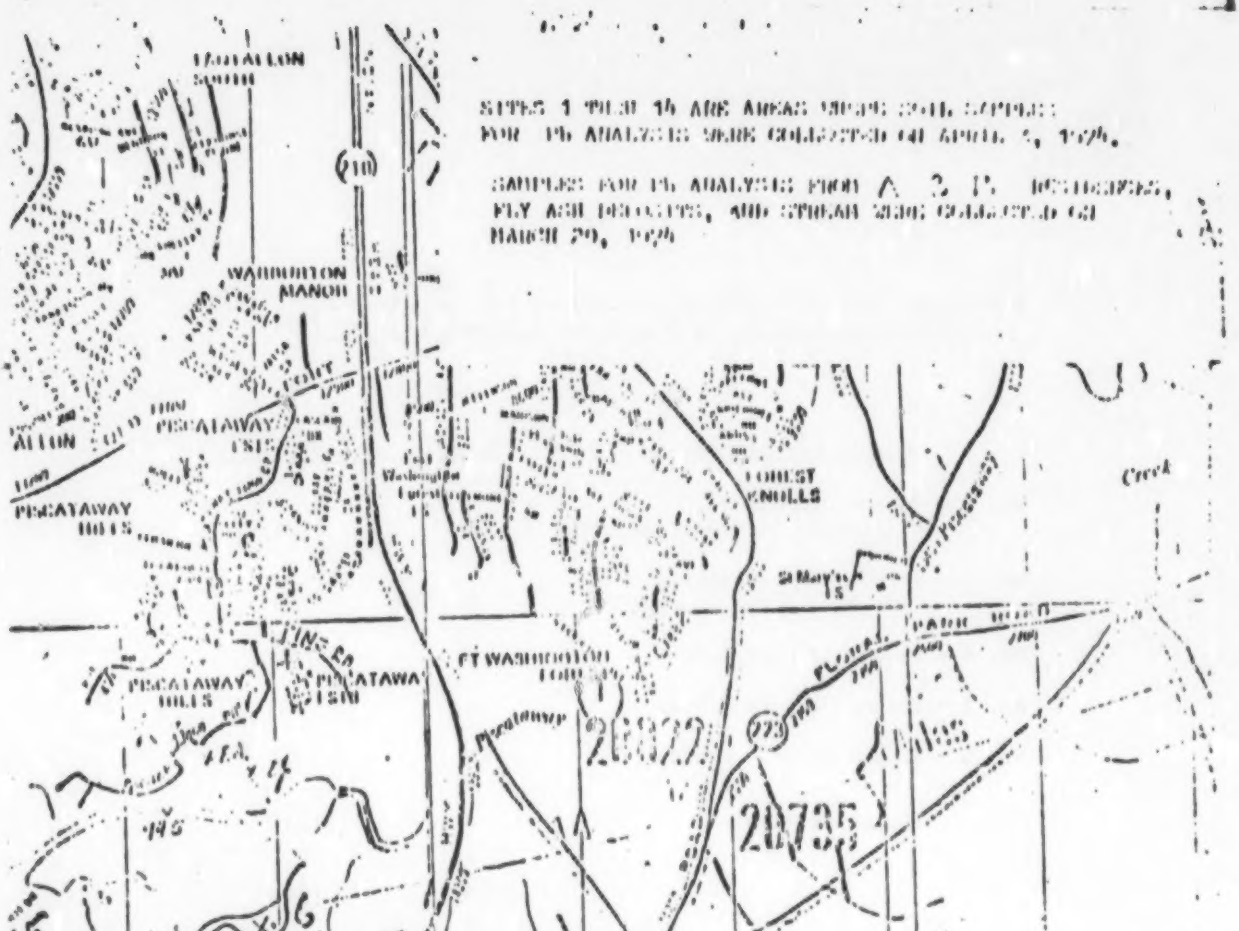
Source and Location of Sample	Pb Level	Sample No.
House A		
Water from kitchen faucet	<0.01 ppm	S955
Crayon and dirt from vacuum cleaner	302 ppm	10
Top soil from play area along swings	17 ppm	1
Top soil from area in front of swing	35 ppm	2
Stone in play area under rear deck	1.6 ppm	3
Stones covered with oil spill from driveway	463 ppm	4
Fly ash from deposits in front of A	27 ppm	8
Fly ash from deposits in front of A	23 ppm	9
Water from Piscataway Creek in front of A	<0.01 ppm	S945
House B		
Water from kitchen faucet	<0.01 ppm	S956
Dirt from vacuum cleaner	20 ppm	S956
Ash from fireplace	1125 ppm	5
Top soil from play fort	45 ppm	6
Top soil from backyard	40 ppm	7
Water from pond next to house	<0.01 ppm	S946

Additional Household Dust and Fireplace Ash Samples
Taken from Houses A, B, and C, on April 5 and April 8, 1976

Sample Description	House	Lead Content PPM
No. 1 - Vacuum Cleaner Dust Filtered for small objects	A	171
No. 3 - Vacuum Cleaner Dust Small objects removed	B	168
No. 4 - Vacuum Cleaner Dust	C	99
No. 2 - Vacuum Cleaner Fibres	A	97
No. 5 - Vacuum Cleaner Fibres	C	22
Fireplace Samples	A	1147
	A	871
	A	1316
	A	822
Fireplace Samples	B	338
	B	280
	B	80
	B	126
	B	1125 - March 29

SITES 1 THRU 14 ARE AREAS WHERE SOIL SAMPLES FOR Pb ANALYSIS WERE COLLECTED ON APRIL 4, 1974.

SAMPLES FOR Pb ANALYSIS FROM A 2 P RESIDENCES, FLY ASH DEPOSITS, AND STREAM WERE COLLECTED ON MARCH 29, 1974



OFFICE OF
PUBLIC
INFORMATION

COURTHOUSE, UPPER MARLBORO, MARYLAND 20870
TELEPHONE 627-3000 EXT. 407 *Night Line 627-3789*
Contact: Sally M. Bucklee
773-1400, ext.452

FOR [illegible]

April 18, 1974

An April 16 progress report to the Prince George's County Council regarding recent investigations into a possible lead problem in the Piscataway area revealed there are no obvious sources of lead and there are no longer any area residents reporting elevated blood lead levels.

On March 26, the Council had directed the County Health Officer, Dr. Perry Stearns, to undertake steps to determine the cause of elevated lead levels reported in two children living near the Washington Suburban Sanitary Commission's sewage treatment plant at Piscataway. WSSC was asked to present a plan to test the lead levels of children attending area schools.

Stearns outlined to the council the scope of the investigation which his agency has undertaken during the ensuing three weeks. This included wide ranging environmental research and a random sample of blood tests on local children.

He told the County Council, which is also the County Board of Health, that of 82 children screened on April 8, the average lead level was 19 micrograms, with a range from 10 to 31. He noted that the test results of individual children have not yet been received from the Baltimore City Health Dept. Laboratory. However, all are considered well within the average range.

Twenty is generally considered the normal average, with a range from 15 to 40 micrograms. A blood lead level of 40 represents the dividing line between normal and abonormal lead absorption; 50 - 79 requires immediate medical follow-up; 80 is lead poisoning.

Midstream in his presentation, Stearns learned that 41 residents of the Piscataway area who have had their blood lead levels tested privately had just submitted the test results to the Council. The two children who had shown elevated lead levels four weeks earlier had been rechecked by venipuncture and were found to be well within the normal range.

MORE

Later in the testimony, Milton B. Cole, M.D., of the WSSC, reported that 43 employes at the Piscataway Plant had been tested. Forty-two of these were well within the normal range, he stated. The other employe was to be re-tested because his blood test had shown a high hematocrit which could throw the test off.

Dr. Kathleen Acree, who heads up the Health Department's special task force looking into the lead situation in Piscataway, explained why the random sample was a vital first step toward a valid public health survey of the community.

A concentrated survey just around the sewage plant would have effectively excluded any other point source of lead, she said, whereas the more general survey of the area was seen as a means to learn the average lead level of the entire community and at the same time to successfully spot any point source of lead threat; including the incinerator, but not exluding any thing else.

Dr. Acree pointed out to the County Council that the majority of lead particles are known to fall out within about 0.20 kilometers (km) of the source of emission. Knowing this, early in the investigation she requested that all employes at the WSSC plant be tested because they would be about the only humans within that range of the incinerator stacks. Most of the area with 1.0 km. of th the plant is uninhabited.

Of the youngsters tested April 8, approximately 48 percent live within three kilometers, or 1.8 miles, of the incincerator. No one lived further than six miles from the plant.

Health officials testifying before the County Council frequently referred to information gleaned from Philip J. Landrigan, M.D., a medical epidemiologist with the Atlanta-based U.S. Public Health Service Center for Disease Control. Dr. Landrigan flew in to consult with Health Department staff on April 10.

Considered one of the nation's top experts in lead poisoning, Landrigran, in examining the evidence in at that point, had zeroed in on the fact that no major and continuing sources of lead had been found. He pointed out that children's blood levels are known to rise under certain conditions, such as fever, dehydration or any other illness or duress and urged that the two children originally reported be verified by the venipuncture method. The finger prick method is considered an excellent screening device, but it is known to give false positives at times because it is easily contaminated during the collection and laboratory processes.

more

LEAD IN THE AIR

Responding to a Council question about the possibilities of lead poisoning from the air, Landrigran was quoted on April 16 as saying that given the normal ingestion of lead from food---and assuming that air was the only environmental agent involved---children would have to be subjected to lead concentrations of 0.0 to 10.0 micrograms per cubic meter of air, 24 hours a day, seven days a week, for three to four months, in order to produce blood lead levels of 31-45 micrograms.

Later during the April 16 testimony, a spokesman for the Environmental Protection Agency noted that preliminary data based on test runs at Piscataway plant, estimated that if the incinerator were running at 80 percent capacity, it would give off four grams per day of lead emissions, or three pounds per year. "Four grams of lead," he said, "equal two gallons of leaded gasoline."

John Koontz, chief of the County Health Dept.'s air pollution program, backed him up with, "The incinerator is not the environmental agent." His research into transportation statistics shows that the incinerator will emit as much lead in one year as cars now emit in one day on Indianhead Hwy. north of Rt. 373.

Across the County, about 3,000 pounds of lead are emitted daily: 57 lbs. from industrial sources; 0.5 lbs. from incineration, and over 2,900 lbs. from car emissions. Incineration and industrial sources will decline because they are on compliance schedules to be phased out or updated.

EPA is currently considering establishing an ambient lead level standard of 2.0 micrograms per cubic meter on an annual average, it was reported.

Average lead levels for the Accokeek area were: 1971, 0.42 micorgrams per cubic meter of air, based on six samples; 1973, 0.20 micrograms, based on nine samples; 1974, 0.022, based on two samples.

HEALTH OFFICER'S POSITION

Dr. Stearns, while agreeing with citizens who have urged that more persons be tested for blood lead levels, stated that limitations of supplies, facilities and personnel dictated the size of the initial blood screening program, which cost just under $11 per child not including any advance preparation or followup work.

A member of Stearns' staff has now been trained to do finger prick screening, but the Health Dept. still must beg for equipment and laboratory time.

-4-4-4-4

Acknowledging that to date he has not unearthed any sources of lead poisoning from the air, water or soil, the Health Officer told the County Council that he is not yet ready to draw any conclusions, but intends to conduct more testing in both the physical and environmental health fields.

"I first want to have enough information to establish whether a problem exists now or not. Then I will have to be sure that we have sufficient information to establish a base line of today's lead levels within the community both environmentally and physically.

"Even if the test results indicate we have no problem today in Piscataway, I intend to follow up on the children and to continue to take environmental and blood samples at appropriate intervals," Stearns said.

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Passed Council 8
5/28/74

COUNTY COUNCIL FOR PRINCE GEORGE'S COUNTY, MARYLAND

Legislative Session 1974
Presented by Councilman Ronald R. Reeder
Introduced by Councilman Ronald R. Reeder
Resolution Number CR - 51 - 1974
Introduced by Council on May 7, 1974

RESOLUTION

WHEREAS, the National Environmental Policy Act of 1969, which went into effect January 1, 1970, states that federal actions significantly affecting the quality of the human environment impact statement; and

WHEREAS, the Environmental Protection Agency approved the grants for sludge incinerators at Piscataway on March 19, 1970, without first preparing an impact statement; and

WHEREAS, subject matter concerning the incinerators were included in the draft Environmental Impact Statement on the expansion for tertiary facilities for the plant to 30 mgd, which was made public after the incinerators were already in operation on a testing basis in February of 1974; and

WHEREAS, according to the National Environmental Policy Act no action can be taken until thirty (30) days after the final Environmental Impact Statement has been approved by the Council of Environmental Quality in the White House; and

WHEREAS, the President of the United States in his environmental message to Congress, "Environmental Quality", Congressional Record, Volume 116, 91st Congress, Second Session, February 10, 1970, said: "I propose that the Federal Government establish national emissions standards for facilities that emit pollutants extremely hazardous to health, and for selected classes of new facilities, which could be major contributors to air pollution", (Point 22 of 37 points to Congress).

K5 684

WHEREAS, the Environmental Protection Agency is presently promulgating standards for mercury, beryllium and asbestos, and setting standards for lead content in the air; and

WHEREAS, the Maryland State and Prince George's County Health Departments and Air Pollution Control Division approved the incinerators in 1970; and

WHEREAS, it was not known in 1970 that there are over thirteen (13) heavy metals and several acids which are emitted into the air from burning sludge; and

WHEREAS, some of these are carcinogenic like asbestor and beryllium, some are accumulative poisons like lead and arsenic, some cause birth defects like mercury; and

WHEREAS, no agency in this country has yet investigated what the combined effects of these agents are on a human being; and

WHEREAS, the Piscataway incinerators are located in the bottom of a box canyon , with hills to the north, east and south of 200' elevations and with the incinerator smokestack heights of 74' elevation; and

WHEREAS, hundred of homes are located above the smokestack height and as close as one-third mile from them; and

WHEREAS, 2,509 children attend schools one and one-fourth mile from the incinerators and 7,500 persons live within the one and seven-eights mile danger zone radius of the incinerators;

NOW THEREFORE BE IS RESOLVED BY THE COUNTY COUNCIL FOR PRINCE GEORGE'S COUNTY, MARYLAND, that the incinerators at Piscatawaywill not be permitted to be operated until thirty (30) days after the final Environmental Impact Statement has been approved by the Council of Environmental Quality, and until standards have been set for the hazardous pollutants from the incinerators, and it has been proved conclusively that these standards in that particular topography will not cause any health hazard to the families living in the area.

ADOPTED this _____ day of ____________________________, 1974.

COUNTY COUNCIL FOR PRINCE
GEORGE'S COUNTY, MARYLAND

By______________________________
Francis B. Francois,
Chairman

ATTEST:

____
Jean M. Schmuhl, Clerk

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PAUL T. SISSON
General Counsel

July 5, 1974

Mr. Dan Snyder
Regional Administrator
EPA Regional III
Curtis Building
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

I am advised by a member of my staff that Mr. Steven Toroc requested that the letter of June 10, 1974 which outlined a contingency plan for the digestion disposal of sludge at the Piscataway Wastewater Treatment Plant be updated to the current situation.

The Commission engaged Whitman Requardt & Associates as a consultant to study and recommend on required modifications to convert one existing aeration basin which currently is not being used for that purpose into an aerobic interim sludge digestion basin. The consultant has prepared a preliminary engineering study and advises that this concept is feasible. Whitman Requardt & Associates have been directed to prepare the necessary engineering plans and specifications for the installation of pipe lines and valves that will make possible the interim adaption of the aeration basin to aerobic sludge digestion. It is expected that all the plans, specifications and construction in accordance therewith can be completed and the structure placed in service for aerobic sludge digestion by November 15, 1974.

I hope this meets with the need of EPA permitting the expeditious completion of the environmental impact statement for the Piscataway effluent line to the Potomac River.

Very truly yours,

Robert J. McLeod

Robert J. McLeod
General Manager

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K6

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JOHN B. KENKEL
General Counsel

June 10, 1974

Mr. Daniel Snyder
Regional Administrator
EPA, Region III
Curtis Building
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

The following outlined contingency plan for sludge treatment and disposal as an alternative to incineration at the Piscataway Wastewater Treatment Plant is in response to your letter of April 5, 1974 requesting evaluation of such a plan along with cost comparisons of alternative sized Piscataway effluent lines and evaluation of a 30 mgd spray irrigation system. Information in response to the latter two points was transmitted to your office on May 15 and May 20. The request for the Piscataway contingency plan was discussed and clarified at a meeting at Region III Headquarters on April 19, 1974 between staff personnel from EPA, WSSC, and Battelle-Columbus Laboratories. The preliminary WSSC report on the contingency plan was sent to your office on May 3, 1974 but no response to this letter has been received to date. Thus, the information presented here is based on our understanding of the sludge disposal contingency plan desired by the EPA in order to proceed with the Piscataway Final EIS without incinerator test results.

The WSSC is actively evaluating several feasible sludge disposal alternatives to incineration as requested by the EPA for the Piscataway 30 mgd AWT Environmental Impact Statement. Basically, the alternative plan of treatment and disposal of the sludge will consist of a process for stabilization of the raw sludge with land application as the ultimate disposal. Two consulting engineering firms have been retained to do preliminary engineering studies of the most viable sludge stabilization processes. Whitman, Requardt and Associates is examining aerobic and anaerobic digestion for the Piscataway Plant. This study is scheduled for completion June 10, 1974. Arthur Beard Engineers, Inc., is performing the engineering study for a Purifax, chlorine oxidation system. The preliminary report on this process was submitted on May 20, 1974. It is currently being revised and the final report is due June 10, 1974.

In addition to these two formal reports, the staff is examining several other stabilization processes. Among the most favorable are lime stabilization, pure oxygen aerobic digestion and composting. These studies will form the basis for a comparative evaluation of these stabilization processes for the selection and further development of the best alternative for Piscataway.

Land application is currently one of the WSSC preferred methods of ultimate disposal for digested or stabilized sludge. While restrictions and regulations on this type of disposal are increasing, it appears to be the most feasible disposal alternative for the foreseeable future. At the present time, anaerobically digested sludge from the three major WSSC plants is transported to the Bevard Farm where it is used for soil enrichment at a rate of about 50 dry tons/acre. Based on current usage, there is enough suitable land under contract for disposal for about 15 more months. Additionally, negotiations have taken place with several neighboring property owners which indicate the availability of additional sites of 320 acres for sludge utilization as needed. These sites have been examined by Prince George's County Health Officials who gave approval for their use. The success of the operation at the Bevard Farm leads the WSSC to believe that it may be successful in renting land for disposal of digested sludge in the future.

Several methods of disposal other than land spreading of the sludge are being pursued. A request has been sent to the County Executive for approval to incorporate sludge at Prince George's County sanitary landfills as a fill or cover material (see attached letter). Also, the Maryland Environmental Service has been asked to include WSSC sludge in the MES program for disposal of raw sludge from the District of Columbia Blue Plains Plant (see attached letter).

Thus, the WSSC is actively pursuing and defining a contingency plan in the event incineration at Piscataway is deemed a health hazard or otherwise restricted. Based on general information available to date, our selection of a sludge treatment plan to be implemented will be one of the following processes:

1. Anaerobic digestion

A thoroughly demonstrated and accepted process for reducing the volatile content of sewage sludge and simultaneously reducing odors and pathogenic bacteria. Methane production provides a substantial additional benefit. This system has a high capital cost and a relatively low operating cost. Estimated time to operation is two to three years.

2. Aerobic digestion

Although not widely practiced across the country, it has been demonstrated in numerous plants of relatively small capacity. This process also substantially reduces the volatile content and pathogens of raw sludge. However, aerobic digestion of primary sludge is relatively inefficient. This system has a high capital cost and moderate operating cost.

3. Chlorine oxidation

This is a commercial process using chlorine for chemical stabilization. It kills all pathogenic organisms, eliminates odors, and produces a stable sludge which can be stockpiled, if necessary, without creating odors. Its suitability is not fully resolved yet for land application, but this point is currently being investigated by the Agricultural Research Service. This system is expected to have a lower capital cost and a higher operating cost than the preceeding alternative number 1. Implementing time is estimated to be a nine month period.

4. Pure oxygen digestion

This process is a further development of the oxygen activated sludge process. It has been demonstrated at several plants, but is still under development. Capital cost would be high along with relatively high operating costs.

5. Lime stabilization

This is a process currently not fully developed, which would produce a chemically stabilized sludge. Capital/operating costs would be relatively low.

6. Composting

The relatively inexpensive process for stabilization of raw sludge is still under development by the Agricultural Research Service. There are serious problems with odors and operation in winter months in composting raw sludge.

7. Flash drying

This process is being demonstrated at the Blue Plains Plant and is expected to produce a marketable end product. Capital and operating costs are high but may be offset if the sludge can be sold.

The present WSSC contingency plan as an alternative to incineration is anaerobic digestion and land application of the digested sludge. While anaerobic digestion is considered the most feasible alternative at this time, as the aforementioned engineering reports and other data are obtained, the WSSC will reevaluate the contingency plan to insure the best treatment alternative is developed. A final decision on the contingent treatment and disposal method cannot be made until all active studies and evaluation of alternatives have been completed.

Any contingency plan will take a substantial amount of time to implement. Anaerobic digestion will require approximately two years to design and construct. A treatment and disposal alternative must be available to handle the sludge generated during this interim period. This interim plan will also consist of a process for stabilization of the raw sludge and land application as the ultimate disposal. At the present time, the contingency plan for treatment and disposal of sludge during the interim period will be anaerobic/aerobic digestion and land application of the digested sludge at the Bevard site. This treatment process and disposal can be supported by existing WSSC facilities and operations.

Initially, the WSSC would anaerobically digest all the sludge in the existing digesters. The Whitman, Requardt and Associates study will consider the feasibility of aerobic digestion of the waste activated sludge using one aeration activated sludge tank not required for plant flows less than 17.5 mgd. This concept will require some piping modifications to improve its effectiveness.

The present interim plan of anaerobic/aerobic digestion and land application is based on the information available today. As additional information is gathered and engineering studies completed, a more feasible method may be developed.

In summary, the WSSC contingency plan for incineration will be stabilization of raw sludge with land application of the stabilized sludge. Currently, anaerobic digestion is the preferred treatment alternative and anaerobic/aerobic digestion the method of treatment until the contingency method is operational. Several studies are still ongoing to evaluate the feasible alternatives, and as this information is generated, the proposed treatment and disposal method may change to reflect the results of these studies. A final decision on the best treatment and disposal alternative will be made as soon as sufficient information is available for a comparative evaluation of these methods. In a telephone conversation on June 4, Steve Toroc indicated that a decision on the contingent alternative to incineration is needed by June 14, 1974. Therefore, every effort will be made to reach a decision by that time in order for the Final EIS to proceed on schedule.

If there are any questions on this information or any matter you believe has not been satisfactorily addressed, please notify our staff as soon as possible to avoid delaying the Piscataway EIS.

Sincerely,

Floyd D. Peterson

Floyd D. Peterson
Chairman

Enclosures

May 28, 1974

RESEARCH DIVISION
RECEIVED
MAY 29 1974
WSSC

The Honorable William W. Gullett
County Executive
Prince George's County
Courthouse
Upper Marlboro, Maryland 20870

Dear Mr. Gullett:

The Commission currently is disposing of its digested sludge at the Sam Bevard Farm. The remaining area of the Bevard tract is adequate for only a few more months of operation. As you know, the Commission has held up further testing of the Piscataway incinerator until the County Health Officer has completed his examination of the lead/blood levels in children of the surrounding area. Meanwhile, the Commission has retained Battelle Laboratories in an effort to examine alternate methods of disposing of sludge, both in its digested and ash forms. Although we intend to keep all avenues open, interim reports from Battelle indicate that, exclusinve of incineration, dependence upon land disposal techniques is the only short range contingency option. One alternative is the disposal of digested sludge at the Brown's Station Sanitary Landfill upon the completion of the operation at the Sam Bevard Farm.

The Commission believes that further consideration should be given to the concept of utilizing digested sewage sludge from WSSC treatment plants in Prince George's County sanitary landfill operations. Because more is understood now about the characteristics of sludge, the use of sludge as an ingredient in landfill cover has an increased appeal and deserves reevaluation. Also, the WSSC believes a well coordinated, regional approach to disposal of all types of solid wastes would provide the most efficient, economical overall service to the public.

Because of growing objections to incineration and a hesitancy to apply sludge to land used in the food chain, all other methods of disposal must be explored. As you know, sanitary landfilling provides an alternative method of sludge disposal that is becoming increasingly favored. Disposal of sludge by sanitary landfill is an accepted practice and historically successful. Unlike other methodology, the technique is well proven and documented. The EPA Guidelines for Land Disposal of Solid Wastes is evidence of this fact on a national scale. Locally, too, there is an increased interest in this subject. As an example, I am attaching a recent letter from Dr. Stearns indicating his viewpoints supporting sanitary landfill over other methods.

There has been some past reluctance to accept sewage sludge as a fill material, but times have changed and there is increased interest in exploring all beneficial uses for sludge. Recognizing the reciprocal benefits from combining solid waste with sludge, our neighbors long ago bid for the lead when the District of Columbia began to use sewage sludge in its sanitary landfill at Lorton, Virginia. Its "Sanitary Landfill Operating Plan and Procedures for the I-95 Resource Recovery, Land Reclamation and Recreation Complex" charted a course to success by incorporating sludge as an ingredient of landfill cover. It would appear that such an approach could well be adopted by our respective agencies to form the basis for a centralized, solid waste management facility for Prince George's County. We believe that the elimination of separate disposal facilities for different types of solid wastes would circumvent a redundant allocation of resources and provide a net saving to the people in the form of a smaller sewer use charge. We are anxious to work as a team with the County toward the achievement of such goals, and the Commission would willingly accept its share of the operating cost for handling sewage sludge in a County sanitary landfill operation.

In encouraging this concept, we also recognize that agreements are attained by negotiations. We would propose to initiate this teamwork by requesting that you designate a staff member to meet with us sometime in the next week or two to pursue this matter in greater detail. We would be glad to conform to your selection of a time and place. Our Project Officer for this action is Mr. Kerry Brough (Ext. 573). Please be assured that we shall maintain a cooperative spirit throughout our relationship.

An expression of your interest and agreement to study the proposal would be appreciated.

Sincerely,

Original Signed - Floyd D. Peterson

Floyd D. Peterson
Chairman

Attachment
cc: The Honorable Francis B. Francois
Dr. Perry Stearns
FDP/WAK/mg
bcc: General Manager #1305/Deputy General Manager/[illegible]

693

May 9, 1974

Mr. Thomas D. McKewen, Director
Maryland Environmental Service
Tawes State Office Building
Annapolis, Maryland 21401

Dear Mr. McKewen:

As a result of the proposed Blue Plains Agreement for flow allocation and sludge disposal, the Washington Suburban Sanitary Commission understands that the Maryland Environmental Service is responsible for disposing of 400 tons/day of undigested solids from the Blue Plains sewage treatment plant. Concurrently, the WSSC is attempting to implement a sludge disposal program for both digested and raw sludge resulting from our own facilities. It appears that a logical approach would be for MES to integrate the WSSC needs with the Blue Plains requirements by developing a regional program for sludge disposal in suburban Maryland responsive to both agencies.

The WSSC sludge quantities during 1974 are expected to average 75 tons/day digested solids or 125 tons/day raw solids. The WSSC requests that the MES program be amended to incorporate the disposal of sludge from the WSSC sewage treatment facilities in conjunction with the Blue Plains Agreement.

Will you please advise us under what conditions you can provide for sludge disposal.

Sincerely,

Original Signed - Floyd D. Peterson

Floyd D. Peterson
Chairman

RESEARCH DIVISION
RECEIVED
MAY 10 1974
WSSC

cc: The Honorable William W. Gullett
The Honorable Francis B. Francois

WAK/AM/mg
bcc: General Manager
A. Machis
✓W. Klein

DEPARTMENT OF HEALTH
PRINCE GEORGE'S COUNTY, CHEVERLY, MARYLAND 20785
(301) 773-1400

OFFICE OF THE
HEALTH OFFICER

W.S.S.C.
JUN 4 1974
[illegible]

June 5, 1974

To

Mr. Walter Klein
Director of Environmental Matters
Washington Suburban Sanitary Commission
4017 Hamilton Street
Hyattsville, Maryland 20781

Dear Mr. Klein:

Members of our staff recently visited several proposed sludge application sites near the present W.S.S.C. application site in Piscataway. Your present operation has not caused any problems in the area, and we would have no objection to your continuing there with new sites that have been checked out and found satisfactory. However, the County Executive and Council must review and approve our recommendations regarding sludge utilization sites.

The proposed sites involve gravel mine areas, active farmland, marginal land, and possibly farmland in the floodplain. Each of these areas needs to have its suitability for sludge evaluated. The Agronomy Department of the University of Maryland and the Agricultural Extension Service can analyze soil samples from each type of land and recommend appropriate sludge loading rates. Members of your staff are familiar with this and other requirements in the guidelines recently prepared by the government agencies involved in the utilization of sewage sludge.

When evaluative information on these sites and a plan to utilize them according to their various capacities is received, we will be happy to forward a positive recommendation to the County Executive and Council.

Very truly yours,

Perry Stearns, M.D.
County Health Officer

PS: jr/lld

c/file

RESEARCH DIVISION
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JUN 1974
WSSC

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JOHN B. KENKEL
General Counsel

May 3, 1974

5/6/74
Orig w/ attach. A+W
cc - [illegible]
[illegible]

Mr. Daniel Snyder
Regional Administrator
EPA Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

This is a reply to your letter of April 5, 1974 in which you requested a contingency plan for sludge handling, treatment and disposal at the Piscataway Wastewater Treatment Plant and certain evaluations to support the final Environmental Impact Statement (EIS) dealing with upgrading of the plant and the construction of an outfall.

As you know, on April 19th, Dr. Machis, Director of Operations and Research; Mr. Klein, Director of Environmental Matters; and staff members of both our Design and Research Divisions visited Philadelphia to discuss in depth the Piscataway situation. Also, our consultant, Battelle Columbus Laboratories, was represented. I understand that the meeting was both informative and productive. We welcome such discussions and will do everything we can to meet your requirements and to provide whatever information is available to us that might assist in the prompt processing of the EIS.

Because the four items listed in your April 5th letter (attachment 1) were discussed at great length at Philadelphia, I shall confine my comments to several salient points. First, I am forwarding a recent Staff Report which was read into the records of the Prince George's County Council meeting on April 16th, 1974 (attachment 2). Referring to your letter, in essence, this report is the framework of the WSSC contingency plan as of this date. Assuming that the scheduled tests of the incinerator will be resumed, the incinerator itself will provide an estimated six-month coverage during its trial in both the unstabilized and stabilized modes. Adding to the pilot period the remaining six-month life of the Bevard site, the Commission has a one-year disposal contingency plan option. Because a six-month time gap could exist between this option and the possible implementation of some available or another preferred method of disposal, the Commission is also concentrating on developing an alternative to incineration.

Concerning your items 1 and 2, I have attached an "Interim Report on Sludge and Fly Ash Disposal/Utilization Options" authored by

Battelle Columbus Laboratories as part of its consultant services to the WSSC (attachment 3). Battelle has informed us that this report is 85% complete and that within the next 60 days, their final report will be submitted. The interim report should be of some help to your preparation of the Piscataway EIS and the final report is being expedited in response to your needs. In our discussions with the Battelle staff during the past week, we have concluded that there is no reason to believe that any technique other than land application offers possibilities as a short range contingency option. Accordingly, we are bending our efforts in that direction.

We are optimistic that our short term contingency plan can be successfully implemented and that the cited gap can be bridged. Basically, we envision stabilizing sludge by aerobic and/or anaerobic digestion. The resultant digested sludge is planned to be deposited on land. In conjunction with the digestion approach, we are investigating the acquisition of additional sludge disposal sites, a matter which will be carefully coordinated with the County Health Officer. The results of these actions will be reported to you in another letter before May 23, 1974.

Exclusive of the above actions, the WSSC has requested from the President of Resource Management Incorporated (RMI) a proposal to list all feasible land disposal sites where RMI can haul and dispose of large quantities of sludge under the County permit system. In providing a readily available commercial backup for closing the six-month gap mentioned above, the RMI capability also provides a third level of redundancy to the disposal system while a fourth level of redundancy (superchlorination, anaerobic or aerobic digestion) is examined or designed for activation. The latter three candidate processes are being developed by two other consultants retained during April. Of course, the fifth and ultimate level of redundancy is the spectrum of research and development items and techniques surfacing as potential advanced technology. Because the latter is not sufficiently finite to constitute a contingency plan, we prefer to commit our resources to an approach founded on the current state of the art.

On April 25th, a major staff meeting was conducted at WSSC with land disposal discussed as the sole subject. As a result, two additional new actions were initiated. First, the Commission is negotiating with owners of additional tracts of land for the continued conduct of land disposal beyond the life of the Bevard site. Secondly, our current contract with Bechtel for the investigation of potential sites for the construction of the regional plant will include an evaluation of the possibilities of conducting on-site land application preliminary to actual construction of the plant (attachment 4). These two new actions should add even greater dimension to the contingency value of the Bevard site.

A fail safe contingency for incineration is our mutual ideal; but the multiple level redundancy outlined above appears to us to constitute a very real and acceptable plan. Considering that not one deficiency has been cited against our existing incinerator, such a plan should suffice. Nevertheless, as we proceed with the actions outlined above and any other significant actions, we shall continue to keep you informed. Meanwhile, having read the EPA draft "Notice of Intent to Issue a Policy Statement on Acceptable Methods for the Utilization of Sludges", we are concerned about possible EPA reservations about land disposal, our principal alternative to incineration. As you can see, the State of Maryland, Secretary of Health and Mental Hygiene is also quite restrictive by confining the application of sludge to grazing lands (attachment 5).

Items 3 and 4 of your letter address cost comparisons for alternative capacity effluent disposal lines and an evaluation of a 30 mgd spray irrigation system. Both of these items will be addressed in separate letters to your office. As you suggested, these requirements are being coordinated with the Chief of the Environmental Impact Branch by members of our staff. A letter providing outfall line costs should be in your office by May 8th. Letters covering the subject of spray irrigation are being solicited from several sources with a target submission date of mid-May.

Again, please be assured that the Commission recognizes the serious responsibility inherent to producing a quality Environmental Impact Statement, and that we intend to be responsive to your requests both in word and deed.

Sincerely,

David H. Elliott
Vice Chairman

WASHINGTON SUBURBAN SANITARY COMMISSION

4017 Hamilton Street, Hyattsville, Maryland 20781 | 277-7700

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General Counsel

December 12, 1973

Mr. Steve Torok
U.S. Environmental Protection Agency
Curtis Building, 6th and Walnut Streets
Region III
Philadelphia, Pennsylvania 19106

Dear Steve:

Attached are copies of the two letters which will be inserted in Appendix K of the "Piscataway Environmental Impact Statement." These letters pursue the alternatives of composting and landfilling of undigested sludge in anticipation of a fuel shortage.

As stated previously, the WSSC is internally investigating other means of sludge disposal such as digestion. I hope this information is helpful to you.

If you have any further questions, do not hesitate to contact me.

Sincerely,

Michael J. Crean

Michael J. Crean
Project Manager

MJC:vt
Enclosures

WASHINGTON SUBURBAN SANITARY COMMISSION

4017 Hamilton Street, Hyattsville, Maryland 20781 | 277-7700

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General Counsel

Crear

December 10, 1973

Dr. Perry Stearns
County Health Officer
Prince George's County
Health Department
Cheverly, Maryland 20785

Dear Doctor Stearns:

As you probably know, the time is rapidly approaching when the Commission will place the Piscataway incineration facilities in operation. In addition, incineration facilities at Parkway are expected to be operational within the next month or two and those at Western Branch are expected to be operational in early 1975.

The decision to dispose of sewage sludge by incineration was made in 1970 when it was the consensus of experts in the sanitary field that sludge incineration was the most advantageous method of sludge disposal. Accordingly, the Commission has proceeded with design and construction of incinerators at its three existing treatment plants. Since the incinerators have been designed to burn raw sludge the use of digesters is unnecessary and therefore not included in our plant expansion program. In light of this, our design contemplates the future conversion of the existing small digesters to sludge holding tanks.

Sewage sludge is being generated at the Commission plants 24 hours a day and the volume of sludge is increasing as service is provided to existing development with septic system problems. At Piscataway the problem is aggravated by the recent diversion of sewage flow from the Blue Plains plant to the Piscataway sewerage system.

The nation is now faced with a severe energy crisis and the availability of #2 fuel oil to the Commission in sufficient quantities to operate these incinerators is at best uncertain. If it is not possible to operate the incinerators because of a fuel oil shortage or other reasons, the Commission must have available other sludge disposal alternatives that can be utilized. Unfortunately, incineration is the only method of raw sludge disposal that has been approved by the authorities.

It has just come to our attention that the County Council has taken the position (via CR-145) that it would be inappropriate to operate the incinerators without further study regarding safety and need.

"Willing Water" — Symbol of Quality Service to the Suburban Maryland Area

730

The Maryland Environmental Service has recently been requested to accept sewage sludge generated by WSSC facilities at its composting site in Beltsville or at other sites that may subsequently be developed. However, contractual arrangements between MES and the District of Columbia may prevent favorable action on our request at this time.

Recently your office issued a permit that allows the Commission under specified conditions to dispose of digested sludge on the Bevard property. It is hereby requested that the County Health Department issue a permit under applicable conditions that will allow the disposal of undigested sludge on the Bevard property. It is estimated that the total quantity of dewatered sludge that will be generated by Commission plants during 1974 will average approximately 100 tons per day. In addition, the plants generate approximately two cubic yards of grit per day. Permission is also requested to bury this material at suitable locations on the Bevard property.

Your prompt consideration of this request will be greatly appreciated. The Commission is presently exploring other possible solutions to the problem and it would welcome any suggestions you may care to make.

Sincerely,

Original Signed - JAMES A. STAPP

James A. Stapp, Director
Design & Construction

JAS:CAH:ffk

bcc: Commission Office
Director of Operations & Research
Design Division Office
Structural & Hydraulics Section ✓

REC'D DESIGN DIVISION
DEC 5 1973
WASHINGTON SUBURBAN SANITARY COMMISSION

December 4, 1973

Mr. Thomas D. McKewen, Director
Maryland Environmental Service
Tawes State Office Building
Annapolis, Maryland 21401

Dear Mr. McKewen:

As you are probably aware, sludge incineration facilities are scheduled to be operational at the Piscataway and Parkway wastewater treatment plants in December of this year and at the Western Branch wastewater treatment plant in early 1975.

Fuel oil which is essential to the operation of these incinerators is in short supply and the Commission may not be able to obtain sufficient quantity to operate these facilities. The real possibility of an insufficient fuel oil supply points out the urgent need for the Commission to have available other sludge disposal options.

It is requested that the Maryland Environmental Service join the Commission in an effort to conserve fuel by consenting to the immediate acceptance of undigested sludge from the Commission plants for composting at the Beltsville Agricultural Research Center or any other appropriate site.

Your favorable response is urgently requested so that the Commission can develop immediately those alternatives necessary to meet the energy crisis faced by our Nation.

Sincerely,

Original Signed - Floyd D. Peterson

Floyd D. Peterson
Chairman

cc: Dr. Perry Stearns, County Health Officer
CAH/js
bcc: Floater File
Director of Operations and Research
Director of Design and Construction
Design Division
S & H Section

Memorandum of Understanding

on

Military Housing Plans for Prince George's County

and

Sewage Treatment Service to Andrews Air Force Base

This Memo of Understanding, drafted as an intermediate-range policy commitment on behalf of the signatories, establishes the framework whereupon the Prince George's County government agrees to authorize work leading toward the connection of Andrews AFB to the Piscataway Sewage Treatment Plant. It recognizes the interrelationship of decisions that must be made by several governmental offices on the Federal and County levels in order to remove the roadblocks and permit several major public construction projects to proceed. The memorandum, negotiated by representatives of the Department of Defense (DOD), Andrews Air Force Base, the Prince George's County Council and County Executive, and the Washington Suburban Sanitary Commission (WSSC), sought to achieve an equitable solution which recognized the interests and legal requirements of the various governmental units involved. Accordingly, the parties signatory hereto agree as follows:

1. It is the intent of the DOD, as reflected in the Facilities Plan for the National Capital Region (NCR), not to consider the Naval Communication Station property at Cheltenham in Prince George's County as a site for military family housing during the period covered by the plan. Further, operational expansion at Cheltenham will be minimal in the long-range NCR plan.

2. It is the intent of the DOD that no additional military family housing be planned within PG County during the long-range planning period described in the NCR Plan, except for those units to be constructed at Andrews AFB pursuant to this Memo of Understanding. DOD further agrees to inform the Prince George's County Government of any revision of the NCR Housing Plan which proposes to allocate additional housing units to the County.

3. The DOD confirms that not more than 1,350 military housing units will be built at Andrews AFB, over and above the 1,016 units existing on January 1, 1974.

4. The DOD agrees to permanently discontinue use of existing sewage treatment plants Numbers 1 and 4 on the west side of Andrews AFB when connection into the WSSC system (Project 59.5 in the adopted PG County 10-Year Water and Sewerage Plan) is completed and operational. Treatment plant No. 3 on the east side of AAFB shall cease to operate when connection into the WSSC system (Project 57.1 in the adopted PG Co. 10-Water and Sewerage Plan) is completed and operational.

5. Prince George's County agrees to authorize the WSSC to provide necessary sewer connections to Andrews AFB to accommodate an average daily dry weather flow of 1.75 mgd from the west side of the base upon ultimate development, and that such connections shall be accomplished in an expedient manner. Upon the signing of the Memorandum of Understanding, the County agrees that the design work associated with Project 59.5 shall commence immediately with the aim of completing construction of the project by January 1975. Provided, however, that the ultimate connection of Andrews AFB to WSSC system shall be contingent upon one of the following:

(a) Final approval by federal authorities of the Piscataway plant outfall line to the Potomac River (Project 96), and an increase in capacity at Piscataway sufficient to cover the Andrews AFB requirements plus other outstanding formal service commitments made by the WSSC in the Piscataway Treatment Plant service area.

(b) The authorization by the Environmental Protection Agency and the State Secretary of Health for the WSSC to utilize the full 30 mgd secondary treatment capacity at the Piscataway Sewage Treatment Plant, with Andrews AFB being accommodated within the first increment above the current 17 mgd authorization.

6. If contingencies specified in paragraphs 5 (a) and/or 5 (b) above are not attainable in time to guarantee the regional connection of the west side of Andrews AFB by January 1975, the County agrees to proceed with that portion of Project 59.5 which would permit flow of sewage from FY '72 funded housing (444 units) into the Piscataway facility by January 1975. This action is contingent only upon authorization by EPA and/or the State Secretary of Health for WSSC to increase the currently approved secondary treatment capacity at Piscataway by the approximately 135,000 gal/day associated with the specified housing. Total connection of Andrews AFB and construction of housing units above and beyond the 444 that have been funded remain contingent on either paragraph 5 (a) or 5 (b) provisions.

7. The parties hereto executed this Memorandum of Understanding by their duly authorized officers and representatives on January _____ 1974.

PRINCE GEORGE'S COUNTY

BY William W. Gullett
WILLIAM W. GULLETT
County Executive

by Francis B. Francois
FRANCIS B. FRANCOIS
Chairman, County Council

DEPARTMENT OF DEFENSE

BY Edward J. Sheridan
EDWARD J. SHERIDAN
Deputy Assistant
Secretary of Defense
for Installations and Housing

HEADQUARTERS COMMAND, USAF

BY Mauro E. Maresca
COL. MAURO E. MARESCA
Deputy Chief of Staff,
Civil Engineering

ANDREWS AIR FORCE BASE

BY Kenneth J. Gunnarson
COL. KENNETH GUNNARSON
Base Commander

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE - 4321 Hartwick Road
College Park, Maryland 20740

May 20, 1974

22 1974

Mr. Walter Klein
Washington Suburban Sanitary Commission
4017 Hamilton Street
Hyattsville, Maryland 20731

Dear Mr. Klein:

During our conversation with you on May 1 we promised that we would get a report to you concerning the feasibility of sprinkler irrigation of waste water from the Piscataway facility. We felt very fortunate in having Mr. Glenn Stuckey, our irrigation specialist for this area, with us and he prepared part of this report. I am sure that you realize that our comments are based on general knowledge. As you know, irrigation systems are designed to a special site condition where the land and the crop would have to be considered. Mr. Stuckey reports the following.

In reviewing the environmental statement on land treatment contained on pages 77 to 90 of the report, I find I cannot find any advantages. In fact, many of the conceptual advantages would not accrue to such a project in the Washington Metropolitan area. The report covers quite well the disadvantages of this proposal. Item b on page 87 and item e on page 89 are very real possibilities. Whereas, the Penn State studies indicate feasibility, many things are different in the Washington Metropolitan area. The effluent from Penn State has very little industrial waste. Long term benefits to field crops in this part of the country are questionable.

The report assumes that a tract or tracts totalling some 7500 acres would be needed. Considering our experience in obtaining right-of-way and the problems related to mains and laterals to suitable sites, makes this proposal unrealistic and probably impossible.

The Muskegon, Michigan area was able to develop a system because they had a large area of relatively flat land that was not developed.

Aside from soils limitations, many physical problems would have to be overcome such as: 1. Land clearing; 2. Topographic problems which limit self-propelled systems; and 3. Pressure regulation requirements.

In addition to the physical problems proponents of this concept assume that farmers are eager to avail themselves of such facilities. In all probability no such condition exists in the Washington Metropolitan area.

Klein

Mr. Robert Shields of my staff has put together the following comments. Again, these comments are based on general soils information and do not replace an onsite investigation of specific land conditions.

Southwestern Prince Georges County is poorly suited for selection of large units of land for disposal of waste water. This can best be demonstrated by the inherent properties of the soils in Soil Associations 2, 5, 6 and 7 on the General Soil Map of Prince Georges County, as published in the Soil Survey of Prince Georges County, Maryland, issued April 1967.

In Soil Association 2 practically all of the soils have impeded drainage, and a large proportion of them are subject to perched water tables that tend to saturate the upper two to three feet of soil from about December through April. During this period of saturation there is considerable subsurface lateral seepage of free water and the infiltration and absorption capacities of the soils are severely reduced.

Soil Association 5 consists of wet floodplain soils and tidal marsh. In general, these soils are already saturated most of the year and flooded so frequently that land disposal of waste water in such areas is considered unfeasible and unhealthy.

Soil Association 6 contains some small areas of deep, well drained, permeable soils that should be well suited for land disposal of waste water. Most of these areas occur as units of only 5 to 10 acres and are generally surrounded by the clayey and slowly permeable Elkton and Keyport soils, which collectively occupy about 70 percent of Soil Association 6. These soils are subject to seasonal high water tables from about December through April. They have rather slow infiltration rates and very slow permeability rates, even in the absence of a water table.

Possibly 50 percent of Soil Association 7 consists of deep, well drained, permeable soils that would have potential for land disposal of waste water, except for excessive slope. The landscape is highly wooded and rather strongly dissected. Short, steep slopes are common.

In summary, Southwestern Prince Georges County is poorly suited for land disposal of waste water due to dense, slowly permeable subsoils, seasonal high water tables, excessive slope, or combinations of the three. The nearest extensive area of soils well suited for land disposal of waste water is approximately ten miles east of the Piscataway plant, in Soil Association 10. These are dominantly deep, well drained, permeable soils. Water moves into and through the soils freely, but yet they have sufficient fine particles in their subsoils to provide good filtering and ionic exchange before the waste water would reach the rapidly permeable, sandy substrata. However, this area too is rather strongly dissected and wooded and locating large, nearly level areas is difficult.

These are the best general comments that we can put together in the time frame that you gave us.

Sincerely,

John H. Gibson acting
Graham T. Munkittrick
State Conservationist

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE - 4321 Hartwick Road
College Park, Maryland 20740

July 3, 1972

Mr. Edward W. Furia
Regional Administrator
U. S. Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Furia:

We have reviewed the Draft Environmental Impact Statement for the District of Columbia Water Pollution Control Plant, dated April 1972, and have the following comments:

1. We are pleased to see appropriate attention given to constructing sediment control.
2. We concur in the problems raised concerning spray irrigation of effluents. Many areas of Maryland including that portion east of the Chesapeake Bay are characterized with soils with limitations to this operation as described.
3. Our Maryland office having Soil Conservation Service responsibility in the District of Columbia will be pleased to assist in any of the proposals including in the statement for which we have expertise such as soils, erosion control and irrigation water management.

We appreciate the opportunity to review this statement and trust our comments are helpful.

Sincerely,

John H. Gibson acting -

Graham T. Munkittrick
State Conservationist

cc: K. E. Grant
T. C. Byerly

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE ADMINISTRATOR

FEB 6 1973

ADMINISTRATOR'S DECISION STATEMENT NO. 5

SUBJECT: EPA POLICY ON SUBSURFACE EMPLACEMENT OF FLUIDS BY WELL INJECTION

This ADS records the EPA's position on injection wells and subsurface emplacement of fluids by well injection, and supersedes the Federal Water Quality Administration's order COM 5040.10 of October 15, 1970.

GOALS

The EPA Policy on Subsurface Emplacement of Fluids by Well Injection is designed to:

1. Protect the subsurface from pollution or other environmental hazards attributable to improper injection or ill-sited injection wells.
2. Ensure that engineering and geological safeguards adequate to protect the integrity of the subsurface environment are adhered to in the preliminary investigation, design, construction, operation, monitoring and abandonment phases of injection well projects.
3. Encourage development of alternative means of disposal which afford greater environmental protection.

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MAR 23 1973

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PRINCIPAL FINDINGS AND POLICY RATIONALE

The available evidence concerning injection wells and subsurface emplacement of fluids indicates that:

1. The emplacement of fluids by subsurface injection often is considered by government and private agencies as an attractive mechanism for final disposal or storage owing to: (1) the diminishing capabilities of surface waters to receive effluents without violation of quality standards, and (2) the apparent lower costs of this method of disposal or storage over conventional and advanced waste management techniques. Subsurface storage capacity is a natural resource of considerable value and like any other natural resource its use must be conserved for maximal benefits to all people.

2. Improper injection of municipal or industrial wastes or injection of other fluids for storage or disposal to the subsurface environment could result in serious pollution of water supplies or other environmental hazards.

3. The effects of subsurface injection and the fate of injected materials are uncertain with today's knowledge and could result in serious pollution or environmental damage requiring complex and costly solutions on a long-term basis.

POLICY AND PROGRAM GUIDANCE

To ensure accomplishment of the subsurface protection goals established above it is the policy of the Environmental Protection Agency that:

1. The EPA will oppose emplacement of materials by subsurface injection without strict controls and a clear demonstration that such emplacement will not interfere with present or potential use of the subsurface environment, contaminate ground water resources or otherwise damage the environment.

*

2. All proposals for subsurface injection should be critically evaluated to determine that:

(a) All reasonable alternative measures have been explored and found less satisfactory in terms of environmental protection;

(b) Adequate preinjection tests have been made for predicting the fate of materials injected;

(c) There is conclusive technical evidence to demonstrate that such injection will not interfere with present or potential use of water resources nor result in other environmental hazards;

(d) The subsurface injection system has been designed and constructed to provide maximal environmental protection.

(e) Provisions have been made for monitoring both the injection operation and the resulting effects on the environment;

(f) Contingency plans that will obviate any environmental degradation have been prepared to cope with all well shut-ins or any well failures;

(g) Provision will be made for plugging injection wells when abandoned and for monitoring plugs to ensure their adequacy in providing continuous environmental protection.

3. Where subsurface injection is practiced for waste disposal, it will be recognized as a temporary means of disposal until new technology becomes available enabling more assured environmental protection.

4. Where subsurface injection is practiced for underground storage or for recycling of natural fluids, it will be recognized that such practice will cease or be modified when a hazard to natural resources or the environment appears imminent.

5. The EPA will apply this policy to the extent of its authorities in conducting all program activities, including regulatory activities, research and development, technical assistance to the States, and the administration of the construction grants, State program grants, and basin planning grants programs and control of pollution at Federal facilities in accordance with Executive Order 11507.

William D. Ruckelshaus

William D. Ruckelshaus
Administrator

Attachment
Recommended Data Requirements for Environmental Evaluation of Subsurface Emplacement of Fluids by Well Injection

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RECOMMENDED DATA REQUIREMENTS FOR ENVIRONMENTAL EVALUATION OF SUBSURFACE EMPLACEMENT OF FLUIDS BY WELL INJECTION

The Administrator's Decision Statement No. 5 on subsurface emplacement of fluids by well injection has been prepared to establish the Agency's position on the use of this disposal and storage technique. To aid in implementation of the policy a recommended data base for environmental evaluation has been developed.

The following parameters describe the information which should be provided by the injector and are designed to provide regulatory agencies sufficient information to evaluate the environmental acceptability of any proposed well injection.

(a) An accurate plat showing location and surface elevation of proposed injection well site, surface features, property boundaries, and surface and mineral ownership at an approved scale.

(b) Maps indicating location of water wells and all other wells, mines or artificial penetrations, including but not limited to oil and gas wells and exploratory or test wells, showing depths, elevations and the deepest formation penetrated within twice the calculated zone of influence of the proposed project. Plugging and abandonment records for all oil and gas tests, and water wells should accompany the map.

(c) Maps indicating vertical and lateral limits of potable water supplies which would include both short-and long-term variations in surface water supplies and subsurface aquifers containing water with less than 10,000 mg/l total dissolved solids. Available amounts and present and potential uses of these waters, as well as projections of public water supply requirements must be considered.

(d) Descriptions of mineral resources present or believed to be present in area of project and the effect of this project on present or potential mineral resources in the area.

(e) Maps and cross sections at approved scales illustrating detailed geologic structure and a stratigraphic section (including formations, lithology, and physical characteristics) for the local area, and generalized maps and cross sections illustrating the regional geologic setting of the project.

(f) Description of chemical, physical, and biological properties and characteristics of the fluids to be injected.

(g) Potentiometric maps at approved scales and isopleth intervals of the proposed injection horizon and of those aquifers immediately above and below the injection horizon, with copies of all drill-stem test charts, extrapolations, and data used in compiling such maps.

(h) Description of the location and nature of present or potentially useable minerals from the zone of influence.

(i) Volume, rate, and injection pressure of the fluid.

(j) The following geological and physical characteristics of the injection interval and the overlying and underlying impermeable barriers should be determined and submitted:

(1) Thickness;

(2) areal extent;

(3) lithology;

(4) grain mineralogy;

(5) type and mineralogy of matrix;

(6) clay content;

(7) clay mineralogy;

(8) effective porosity (including an explanation of how determined);

(9) permeability (including an explanation of how determined);

(10) coefficient of aquifer storage;

(11) amount and extent of natural fracturing

(12) location, extent, and effects of known or suspected faulting indicating whether faults are sealed, or fractured avenues for fluid movement.

(13) extent and effects of natural solution channels

(14) degree of fluid saturation;

(15) formation fluid chemistry (including local and regional variations);

(16) temperature of formation (including an explanation of how determined);

(17) formation and fluid pressure (including original and modifications resulting from fluid withdrawal or injection);

(18) fracturing gradients;

(19) diffusion and dispersion characteristics of the waste and the formation fluid including effect of gravity segregation;

(20) compatibility of injected waste with the physical, chemical and biological characteristics of the reservoir; and

(21) injectivity profiles.

(k) The following engineering data should be supplied:

(1) Diameter of hole and total depth of well;

(2) type, size, weight, and strength, of all surface, intermediate, and injection casing strings;

(3) specifications and proposed installation of tubing and packers;

(4) proposed cementing procedures and type of cement

(5) proposed coring program;

(6) proposed formation testing program;

(7) proposed logging program;

(8) proposed artificial fracturing or stimulation program;

(9) proposed injection procedure;

(10) plans of the surface and subsurface construction details of the system including engineering drawings and specifications of the system (including but not limited to pumps, well head construction, and casing depth);

(11) plans for monitoring including a multi-point fluid pressure monitoring system constructed to monitor pressures above as well as within the injection zones; and description of annular fluid;

(12) expected changes in pressure, rate of native fluid displacement by injected fluid, directions of dispersion and zone affected by the project;

(13) contingency plans to cope with all shut-ins or well failures in a manner that will obviate any environmental degradation.

(1) Preparation of a report thoroughly investigating the effects of the proposed subsurface injection well should be a prerequisite for evaluation of a project. Such a statement should include a thorough assessment of: 1) the alternative disposal schemes in terms of maximum environmental protection; 2) projection of fluid pressure response with time both in the injection zones and overlying formations, with particular attention to aquifers which may be used for fresh water supplies in the future; and 3) problems associated with possible chemical interactions between injected wastes, formation fluids, and mineralogical constituents.

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DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203

NABOP-P(Washington Suburban Sanitary Comm.)4 29 October 1973

PUBLIC NOTICE

TO WHOM IT MAY CONCERN:

The U. S. Army Engineer District, Baltimore has received a revised application from the Washington Suburban Sanitary Commission, 4017 Hamilton Street, Hyattsville, Maryland 20781 for a Department of the Army permit to install a pipeline and to dredge a trench in Potomac River near Accokeek, Prince Georges County, Maryland.

Copies of the plans are attached to this sheet. The plans indicate that the proposed pipeline will be buried as least 2 feet below the river bottom and will extend 1,650 feet channelward of the mean high water shoreline at a point 0.3 mile downstream from Mockley Point. The plans also indicate that approximately 40,000 cubic yards of material, consisting of silty sand with organic matter, will be dredged by bucket dredge and deposited and retained landward of the mean high water shoreline.

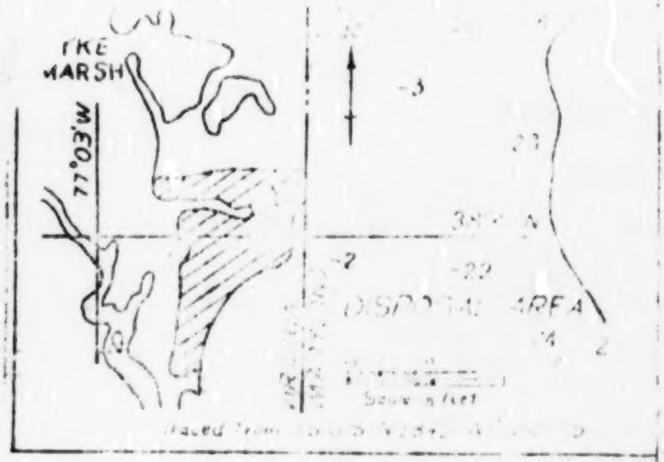
The decision as to whether a permit will be issued will be based on an evaluation of the impact of the proposed work on the public interest. Factors affecting the public interest include, but are not limited to, navigation, fish and wildlife, water quality, economics, conservation, aesthetics, recreation, water supply, flood damage prevention, ecosystems, and, in general, the needs and welfare of the people. Comments on these factors will be accepted and made part of the record and will be considered in determining whether it would be in the best public interest to grant a permit. All comments should be furnished in writing to this office on or before 28 November 1973.

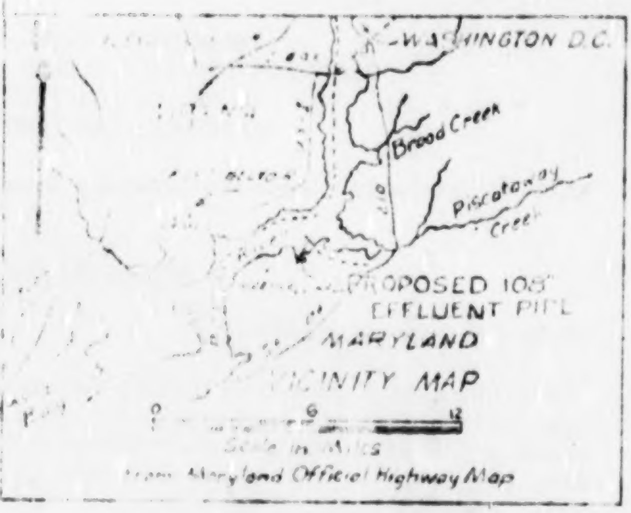
It is requested that you communicate the foregoing information concerning the proposed work to any persons known by you to be interested and who, not being known to this office, do not receive a copy of this notice.

FOR THE DISTRICT ENGINEER:

John P O'Hagan
JOHN P. O'HAGAN
Chief, Operations Division

2 Drawings attached





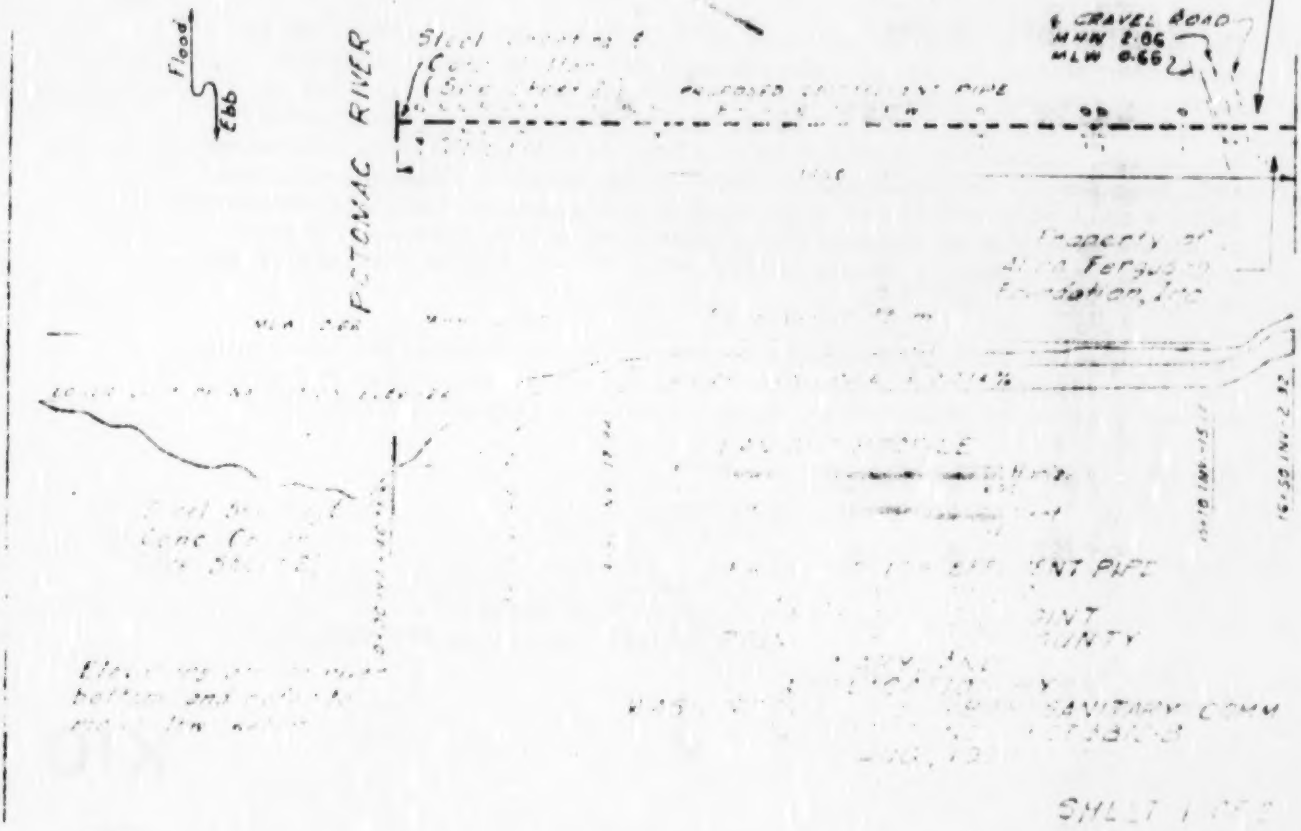
Approximately 40,000 CY to be excavated [illegible] dredge. All excavated material to be disposed of at Dyke Marsh Disposal Area

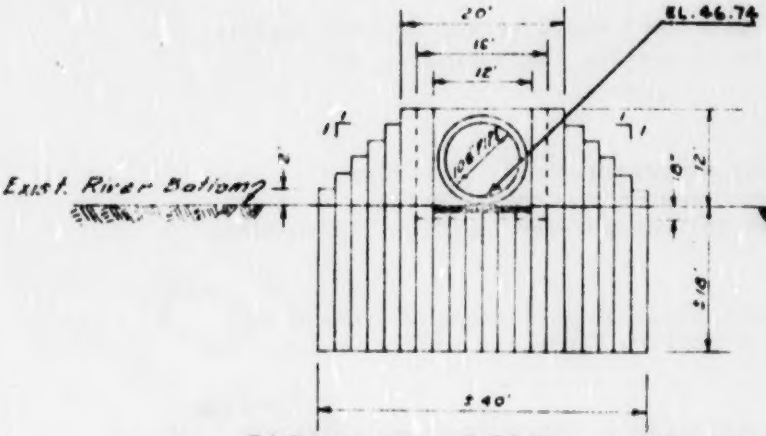
Material to be removed by dredging [illegible] composed of silty sand with organic matter.

Operating [illegible] carry 325 mgd [illegible] slightly in excess of [illegible] 2,000 peak flow at Piscataway [illegible]

Quality of effluent from Piscataway [illegible] AWT Plant now under design; BOD [illegible] 5ppm Phosphorous - .2ppm Nitrogen 3ppm

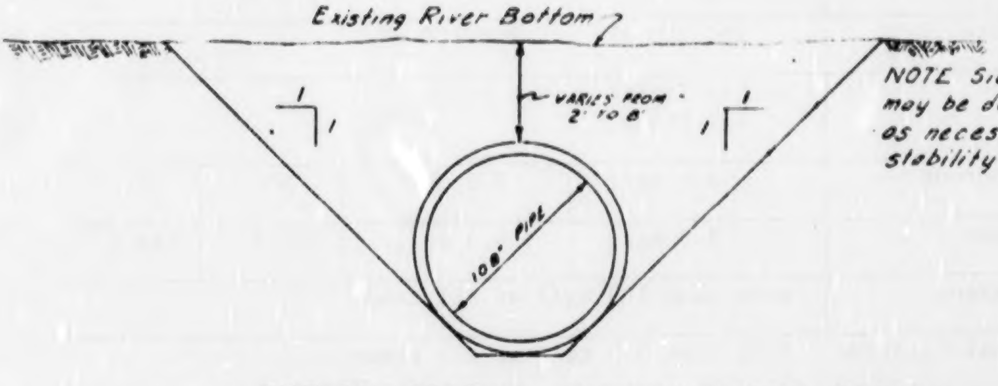
[illegible] Interior, National Park
[illegible] Capital Parks-East
[illegible] Highway,
[illegible] Md 20021


Flood
Ebb
POTOMAC RIVER
Steel Sheeting & Conc. Collar (See Sheet 2)
PROPOSED EFFLUENT PIPE
℄ GRAVEL ROAD
MHW 2.86
MLW 0.66
Property of Alice Ferguson Foundation, Inc.
Steel Sheeting & Conc. Collar (See Sheet 2)
Elevations [illegible] bottom and [illegible]
PLAN & PROFILE
[illegible] EFFLUENT PIPE
[illegible] COUNTY
[illegible] SANITARY COMM
SHEET 1 OF 2



ELEVATION STEEL SHEETING

SCALE 1" = 20'



NOTE Side slopes may be decreased as necessary for stability

TYPICAL SECTION SHOWING PIPE IN TRENCH

SCALE 1/8" = 1'-0"

NOTES:-

1. A minimum coer of two feet of rock fill shall be placed over exposed pipe behind steel sheeting to extend to existing river bottom at center line of pipe and having side Slopes of 1 to 1 or flatter as necessary to maintain stability.
2. A dumped rock apron of 18 inches minimum depth shall extend from the steel sheeting at the end of the pipe a minimum distance of 10 feet and divering from 10 feet wide to 30 feet wide
3. All pipe joints are to be harnessed.

PROPOSED 108" EFFLUENT PIPE
WSSC CONTRACT NO. 69CT3872-B
Aug., 1973
SHEET 2 OF 2

Proposed Effluent Limitations for Point Source 002 Discharging into the Potomac River (from the Piscataway Wastewater Treatment Facility)

The proposed final effluent limitations would be effective according to the compliance schedule date of meeting these limitations.

(1) The 30 consecutive day average quantity of effluent discharged from the wastewater treatment facility shall not exceed 30 million gallons per day (mgd) or 113550 cubic meters per day.

(2) The quality of effluent shall be limited at all times as specified in General Condition Number 16 and as follows:

Parameter	Average Effluent Concentrations		Average Effluent Loadings	
	30 Consecutive Day Period	7 Consecutive Day Period	30 Consecutive Day Period	
			lbs/day	Kg/day
Biochemical Oxygen Demand (5-day)	5 mg/1	7.5 mg/1	1251	568
Suspended Solids	5 mg/1	7.5 mg/1	1251	568
Fecal Coliform	200/100 ml	200/100 ml	---	---
pH	within limits of 6.0 - 8.5 at all times			
Total Phosphorous	0.2 mg/1	0.3 mg/1	50	22.7
Total Nitrogen	3.0 mg/1	4.5 mg/1	750.6	340.5
Dissolved Oxygen	more than 5.0 mg/1 at all times			
Total Residual Chlorine	less than 0.5 mg/1 at all times			

WASHINGTON SUBURBAN SANITARY COMMISSION
ENVIRONMENTAL MATTERS
INTER-OFFICE MEMORANDUM

TO: MR. McLEOD, GENERAL MANAGER

FROM: WALTER A. KLEIN, DIRECTOR OF ENVIRONMENTAL MATTERS

DATE: JULY 16, 1973

SUBJECT: PROPOSED ENVIRONMENTAL SPECIFICATIONS AS REVISIONS TO THE GENERAL SPECIFICATIONS

Attached is a set of proposed Environmental Specifications which contain amendments and additions to the existing General Specifications. The Legal, Safety, and Specifications Sections have reviewed the preliminary drafts and this final draft reflects their suggestions. Also, the Construction Division Engineer indicates no objection to adopting these new specifications as written.

We have attempted to integrate new environmental requirements with existing sections related to environmental concerns. The layout has been modified to provide a flexible framework for making future additions. Also, the material clarifies and tightens our environmental policies in such areas as sediment control, tree care, removal and replacement, and seeding/sodding requirements. In short, we feel the new Environmental Specifications will provide better control and improved standards of workmanship.

Accordingly, I request your approval that we might publish this material in August.

Walter A. Klein

WAK/dt
Attachment

Endorsed by:

Specifications 7/23/73

Construction 7/23/73

Legal 7/24/73

Safety

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OUTLINE FOR PROPOSED ENVIRONMENTAL SPECIFICATIONS-SECTION 1-24

INTRODUCTION

Purpose 1
Scope 1
Agreements 1

I. Clearing

General 2
Tree Removal 2
Waste Disposal 2

II. Construction

General 3
Erosion and Sediment Control . . . 3
Stream Pollution 4
Dewatered Trenches 4
Air Pollution 4
Tree Protection 5

Combines Sections 1-24, 1-33, and 2-22 with changes and additions. Major deletion is paragraph on sloping of trenches (1-24, pg. 9) moved to Section 2-04 of current Specifications.

III. Restoration

General 6
Waste Disposal 6
Log Disposal 6
Tree Repair 7
Seeding and Sodding 7
Delinquent Restoration 12
Post-Restoration 13
IV. Maryland-National Capital Park and Planning Commission (Currently Section 1-25, no additions) 13
V. Maryland and National Park Services (New subsection) 16
VI. Other Public Areas 16

General

Along Traveled Roads . . . . (Combines Section 1-26 and 27) . . . 16
In Vicinity of Trees 18

Section [illegible]

This section outlines the responsibilities and actions of the Engineer and the Contractor as they pertain to the prevention and control of environmental pollution. Environmental pollution is defined as the presence and action of physical, chemical, biological and human agencies that adversely affect individual and community health and welfare; unfavorably alter or destroy ecosystems of importance to man; or degrade significant aesthetic and recreational values.

The work responsibilities stated below consist of the furnishing by the Contract of all labor, material, equipment, monies and effort required for the prevention and control of environmental pollution that results, directly or indirectly, from a construction project. Prior to starting a construction project, the Contractor will meet with the Engineer to develop a complete and mutual understanding of the Contractor's responsibilities. In the performance of their work, Contractors shall familiarize themselves with and comply fully with all applicable Federal, State and local laws and regulations, including these General Specifications and any other Special Provisions as may be set forth in the Contract. Work of any nature shall conform with the State of Maryland's Occupational Safety and Health Act of 1973, as applicable.

The following three subsections refer primarily to construction projects undertaken on private property. Specifications for construction on property owned or administered by the Maryland-National Capital Park and Planning Commission, Maryland an National Park Services and other public areas are presented separately.

Where work is to be performed in rights of way, rights of way agreements will be secured by the Commission without cost to the Contractor. The Commission will also obtain from the property owner(s) permission to occupy, during construction, strips of land (construction strips) outside the limits of these rights of way as shown on the drawings. Normally, no arrangements will be made by the Commission for any means of access to the rights of way or construction strips. The Contractor, therefore, shall be required to make his own arrangements for access to the work areas. Such arrangements shall be in writing and must contain a clause to the effect that the requirements and standards of restoration for the access ways shall be the same as those applicable to the Commission's rights of way unless the property owner waives

Pages 724 and 725
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provision in the access agreement by lineout and initial of the clause. A copy of the final access agreement shall be sent to the Engineer.

Where rights of way are required but agreements have not been secured, prospective bidders shall obtain written permission from the owners of the property through which the construction is proposed in order to make preliminary investigations, including soil test borings.

During clearing, construction and restoration, the Contractor shall confine his operations strictly within the designated limits of the rights of way and construction strips unless he has the written permission of a property owner to occupy additional ground. This written permission must be forwarded to the Engineer prior to any work being performed outside the designated limits. The same requirements applicable to securing access routes will apply.

I. Clearing

The Contractor shall clear the working areas as shown on the drawings. Clearing operations shall be planned and conducted so as to prevent unnecessary damage or disturbance to vegetation, terrain and streamcourses. Fences shall be disturbed as little as possible; if damaged or removed, they shall be repaired or replaced at least to their original condition. Property pipes, stones and monuments are to be protected before beginning operations near them. If damaged or destroyed, these markers shall be reset by a registered surveyor at the Contractor's expense.

Trees in the construction strips are not to be felled unless authorized in the right of way agreement or unless written permission is given by the property owner in which case, a copy of this permission will be forwarded to the Engineer for filing. Trees within the limits of the rights of way shall be felled unless otherwise specified in the right of way agreement. Special care shall be taken in felling trees to avoid damage to remaining ones and to prevent accidents. All trees felled outside of the trench excavation by the Contractor shall have their stumps blasted or cut down to ground level. All trees which were felled within the trench excavation shall have their stumps removed and disposed of in an authorized area.

All debris, including logs, branches, dead trees, underbrush, and refuse shall be removed from the working area or, if permitted, burned on-site. Lunch papers, empty cans, bottles and other empty containers shall not be strewn about or allowed to accumulate on the property and shall be disposed of promptly. Burning, if authorized by a permit, shall be done at locations and times as approved by the Engineer and in a manner that will avoid all hazards. The Contractor shall be responsible for compliance with Maryland State Dept. Health and Mental Hygiene Air Pollution Regulations and will obtain all necessary permits pertinent to burning cleared materials.

II. Construction

All Construction work shall be conducted with a minimum of disturbance of the land area affected and shall be in strict compliance with any Special Provisions that may be set forth in the contract documents.

The location(s) of the Contractor's storage area, construction buildings, materials and equipment shall be upon cleared portions of the work area. The location(s) will require prior written approval of the Engineer. In the selection and approval of such sites, the decisive criterion will be the prevention of environmental pollution to the maximum extent practicable.

All Contractors shall comply with the WSSC Sediment Control Plan and Permit issued as a part of the contract documents. Field inspection and enforcement will be conducted in Prince George's County by a WSSC Sediment Control Specialist and in Montgomery County jointly by WSSC and the Department of Environmental Protection. Failure to comply with the provisions of either the Plan or Permit shall result in the suspension of the Permit and all work will be suspended by issuance of a stop-work order. Upon correction of a violation, the Contractor may apply for removal of the suspension.

In general, surface drainage from within the construction site and from borrow, waste and storage areas shall, if turbidity producing materials are present, be contained in suitable sediment catchment basins or ponds. If judged necessary by the Engineer, other temporary erosion and sediment control measures such as berms, dikes and drains shall be provided by the Contractor and maintained until permanent control structures are operative. If any control measures are disturbed during construction, they shall be repaired at the end of each working day to a condition equal to that prior to disturbance, unless otherwise directed by the Engineer.

Four widely accepted methods to reduce erosion and sediment loading are: clearing and exposing the least area of land feasible for construction; exposing the disturbed area for the shortest time possible; installing and maintaining sediment traps; and accomodating increased runoff. The U.S. Soil Conservation Service Handbook of "Standards and Specifications for Soil Erosion and Sediment Control in Urbanized Areas," adopted *with revisions by the Maryland State Water Resources Administration, is the official guide for erosion sediment control measures and their applications.

The Contractor shall not pollute streams with soil, fuels, oils, bitumens, acids, calcium chloride or other foreign materials. Water used in aggregate processing, concrete curing, foundation and concrete lift cleanup or any other waste waters shall not be allowed to re-enter a stream.

Pumping or dewatering of trenches shall be performed by the Contractor. At all times the Contractor shall maintain ample means and devices with which to remove promptly and dispose properly of all water entering the trench excavation. Water shall be disposed of in a suitable manner without damage to adjacent property or without being a menace to public health and convenience.

Pumping or dewatering of a trench shall commence when ground water is first encountered and shall be continuous until such time as submergence in water will not damage the pipeline or other structures. Dewatering shall be accomplished by well points, sumping, or any other acceptable method which will insure a dewatered trench. Any dewatering method shall be subject to the prior approval of the Engineer. No payment will be made for the removal of water. The Contractor shall discharge the pumped water to a stabilized area or sediment basin.

The Contractor will be required to maintain all excavations, embankments, stockpiles, access roads, plant sites, waste disposal, and borrow areas, and all other work areas within and outside of the project boundaries free from air pollutants which would violate Maryland State Dept. of Health and Mental Hygiene Air Pollution Control Regulations for Montgomery and Prince George's Counties (Area IV). Control of air pollutants, as required in the above noted regulation, shall be performed as the work proceeds and whenever a nuisance or hazard is likely to occur. No separate or direct payment will be made for control of air pollutants and the cost thereof shall be considered incidental to and included in the total bid price.

Except in areas designated in the contract documents to be cleared, the Contractor shall not deface, injure or destroy trees without obtaining prior written permission to do so from the property owner and placing said document on file with the Engineer. Where trees may possibly be defaced, injured or otherwise damaged during working operations, the Contractor shall adequately protect such trees by utilizing suitable wooden boards or other guards so placed as to protect roots, trunks, and branches. No ropes, cables or guy wires shall be fastened or attached to an existing tree for anchorage unless specifically authorized by the Engineer. Where such special emergency use is permitted and before any rope, cable or wire is placed, the Contractor shall first wrap the trunk with sufficient burlap or rags overlain with softwood cleats. The Contractor will be held responsible for any damage resulting from these actions.

Wherever tunneling of trees is required, their roots shall be disturbed as little as possible. The backfill around tree roots shall be of suitable soil, carefully tamped into place to eliminate air pockets. Backfilling around tree roots shall be done immediately after the pipe has been laid.

Tree trimming with axes and use of climbing spurs will not be permitted. For safety, the use of climbing ropes may be required.

The Contractor should avoid insofar as possible piling excavated material close to and around the bases of living trees. When such piling is unavoidably necessary, any excess excavated material shall be removed immediately after backfilling is completed. Surface runoff shall not be diverted to or otherwise allowed to accumulate around tree bases on and off the construction site.

The Engineer will notify the Contractor of any violation of the above provisions and specify the corrective action to be taken and the completion date. If the Contractor fails or refuses to comply in a satisfactory or timely manner, the Engineer may issue an order stopping all or part of the work until the specified action has been completed. Time and monies spent as a result of compliance with this stop-work order are not recoverable.

III. Restoration

The requirements and standards of restoration as presented below shall apply to all areas disturbed by the Contractor.

Restoration, including cleanup, shall proceed as quickly as practicable after pipe laying or any other construction activity is completed in a given area. The period between the completion of the construction activity and final restoration shall normally not exceed two weeks (ten working days). Operational or natural factors, such as limited access or adverse weather conditions, may justify exceptions to this requirement if approved by the Engineer.

The Contractor shall, without charge therefore, tear down and remove all temporary construction facilities and foundations built by him and leave the line of work in a clean and orderly condition. Excluding special conditions imposed by the Right of Way agreement, all waste materials to include logs, branches, construction debris, trash, garbage, oil, grease, chemicals, and human wastes shall be disposed of in an authorized county disposal area or an area covered by a current grading permit or an area designated by the Contractor if acceptable to the Engineer. In any case involving the offsite disposal of waste materials, evidence of the legitimacy and/or proper use of the disposal site may be requested by the Engineer. If any waste material is dumped in unauthorized areas, the Contractor shall remove the material and restore the area to a condition acceptable to the Engineer.

If in the right of way agreement it is specified that the property owner wants any logs cut on his property to remain on his property, the Contractor shall insure that all such logs are removed and stored outside of the right of way and outside of any existing flood plain. If during the course of construction, the property owner should decide to keep logs cut on his property as a result of clearing operations and it was not so specified in the right of way agreement, the owner must request in writing that the Commission amend the right of way agreement to that effect. Again, all such logs will be stored off the right of way and outside of any existing floodplain. Concerning the disposition of cut trees, the terms of the right of way agreement and its amendments shall prevail.

Any unauthorized damage to trees or other landscape features in the course of clearing or construction shall be repaired, paid for or otherwise corrected by the Contractor to the satisfaction of the property owner.

All tree repair work shall be performed by a tree surgeon licensed by the State of Maryland. Tree repair work shall include but not be limited to the proper treatment of damaged or trimmed branches and all scars resulting from construction activity. All trees killed or mortally injured as a direct or indirect result of construction activity shall be disposed of in accordance with these General Specifications or any agreements made between the owner and the WSSC.

Where tree planting is required by the right of way agreement, in Prince George's County, it shall be in accordance with that County's specifications, and in Montgomery County the State Specifications shall apply. The applicable specifications will hold regardless of the origin of planting stock.

SEEDING AND SODDING

A. Seeding. Where seeding is required to restore areas which have been disturbed during construction work, or in other areas specified, shown or directed by the Engineer, the Contractor shall furnish all labor material and equipment required to complete the work as described herein.

Where seeding is required to restore areas which have been disturbed during construction work, or in area specified, shown, or as directed by the Engineer, the Contractor shall furnish and place topsoil prior to seeding. All topsoil used in site preparation for seeding shall consist of a friable sandy or silty loam containing no subsoil material and, in the opinion of the Engineer, be capable of supporting a good grass cover. Prior to excavation work, any topsoil present may be stripped, stored, and protected from erosion for reuse in seeding if said topsoil meets the above requirements. Where disturbed areas to be seeded are composed of a material which will not, in the opinion of the Engineer, sustain plant growth, topsoil shall be furnished by the Contractor. The quality and source(s) of said topsoil shall be approved by the Engineer. Following construction all stones larger than 1½ inches in diameter, trash, limbs, roots and logs shall be removed from the surface. Next, the surface shall be loosened by disking or by scarifying to a depth of at least two inches to permit bonding of the topsoil. Thereafter, the reclaimed and/or new topsoil shall be evenly spread on the disked surface to a minimum depth of four inches.

Fertilizer shall be uniform in composition, free flowing and delivered to the site fully labeled according to applicable State fertilizer laws and shall bear the name, trade name or trade-mark and warranty of the producer. Unless otherwise specified, an open formula fertilizer consisting of 10% Nitrogen (N), 10% available Phosphate (P_2O_5) and 10% water soluble Potash (K_2O), commonly known as 10-10-10, shall be applied. Fertilizer shall be applied at a rate of 23 lbs. per 1,000 sq. ft. (1,000 lbs. per acre).

Lime shall be ground limestone which contains at least 50% total oxides (calcium oxide plus magnesium oxide). The limestone shall be ground to such a fineness that at least 50% will pass through a 100-mesh sieve and 98% will pass through a 20-mesh sieve. Lime shall be applied at a rate of 70 lbs. per 1,000 sq. ft. (1½ tons/acre) on sandy and silty soils or 140 lbs. per 1,000 sq. ft. (3 tons/acre) on clay or clay loam soils.

Lime fertilizer, singularly or combined, shall be uniformly mixed into the top three inches of topsoil by disking or harrowing. Light dragging (e.g. with chain link fence) may be required to insure a firm friable seedbed.

After seedbed preparation the Contractor shall furnish a seed mixture selected by the Engineer from one of the following seed mixtures except where special seed mixtures may be required to match existing conditions:

A. For improved areas which will be mowed regularly: Certified Seed.

Common Kentucky Bluegrass	40 lbs.	40%
Merion Kentucky Bluegrass	40 lbs.	40%
Creeping Red Fescue (Pennlawn or Jamestown variety)	20 lbs.	20%
	100 lbs/Acre or 2.5 lbs/1,000 sq. ft.	100%

B. For unimproved areas not to be mowed or to be mowed infrequently: Certified Seed.

Tall Fescue (Ky-31 variety)	100 lbs	80%
Hulled Sericia Lespedeza (Inoculated in a dark area and within 4 hrs. of use)	25 lbs.	20%
	125 lbs/Acre or 3 lbs/1,000 sq. ft.	100%

Note: If seeded between May 15 and August 15, add 2 lbs/Acre of Weeping Lovegrass seed to the mixture

C. For poorly drained areas: Certified Seed.

Tall Fescue (Ky-31 variety)	45 lbs.	75%
Reed Canarygrass	15 lbs.	25%
	60 lbs/Acre or 1½ lbs/1,000 sq. ft.	100%

D. For temporary grass stabilization:

Sudangrass	30 lb/Acre or .7 lb/1,000 sq. ft.
or	
Millet	35 lb/Acre or .8 lb/1,000 sq. ft.

It is recommended that seeding be accomplished between February 15 and May 15 or between August 15 and October 15. From May 15 to August 15 seeding may be performed in unimproved areas providing Weeping Lovegrass is added to seed mixture "B" above at a rate of two pounds per acre.

During those periods of the year when weather conditions do not permit the establishment of a permanent grass cover, the Contractor shall use one or more of the following methods to prevent erosion until such time that a permanent grass cover can be established: (a) spread a temporary straw mulch and anchor it; (b) use a temporary seeding; (c) sod the area; (d) lime, fertilize, and mulch, as specified and follow by an overseeding of the area during the next seasonal seeding period, or (c) use other erosion control measures acceptable to the Engineer.

All seed shall be Certified and have a minimum guaranteed germination of 85% except for the temporary seeding in mixture "D" above. Serecia Lespedeza seed shall be inoculated within four hours of the seeding operation with a nodule forming organism in a dark or shaded area. Failure to comply with this stipulation will result in a poor stand and a rejection of the restoration until the Lespedeza successfully germinates and indicates the ability to survive. All seed mixtures shall be sown uniformly over the area by use of a mechanical seed spreader. If the seedbed is reasonably dry, a light rolling, raking, or dragging should be accomplished to bring the seed in firm contact with the soil. This will hasten germination and seedling growth. Inaccessible areas may be seeded by a portable, hand operated, seeder.

All seedbed areas shall be mulched with clean, bright straw at a rate of not less than 70 lbs. per 1,000 sq. ft. (1½ ton/Acre), anchored by one of the following methods: mulch anchoring tool (preferred method), emulsified asphalt (.04 gal/sq. yd), liquid asphalt (.1 gal/sq. yd), Curesol AH (.04 gal/sq. yd), Terra Tack (.2 gal/sq. yd) or a mulch netting. This same mulching procedure will apply to all temporary mulching work.

The Contractor, at his option, may spray the required lime, fertilizer and seed mixture by means of a hydraulic seeder. The same standards of seedbed preparation apply as for conventional seeding. Immediately thereafter, the seeded area will be straw mulched and anchored as described above.

In all cases, the Contractor shall water, cut, reseed and maintain all seeded areas until such areas are covered with an acceptable turf and until final acceptance by the Engineer.

Unless a specific item for the payment of the seeding operation is included in the proposal form, the cost of such seeding shall be included in the unit price bid for excavation and backfill. (Sections 4-26 and 4-38, General Specifications).

B. Sodding. All disturbed lawns shall be sodded. Wherever sodding is required to restore disturbed areas, the Contractor shall furnish all labor, material and equipment required to complete the work described herein.

Specifications for the provision, quality and placement of topsoil for sodded areas are the same as those set forth for seeded areas.

Lime and fertilizer requirements shall be of the same quality and applied in like manner as prescribed in the Seeding Section above. The lime and fertilizer, singularly or combined, shall be uniformly mixed into the top three inches of soil by light disking or harrowing. Thereafter, a light dragging, raking or rolling shall be accomplished to insure a firm friable sodbed.

After placement of topsoil and treatment with lime and fertilizer, as specified, the Contractor shall furnish and place sod. Where a bluegrass lawn existed prior to starting construction, "Maryland State Approved," General Purpose Turf Sod described below will be applied. Where a special variety of grass existed, (e.g., Zoysia, Bermuda, etc), an identical variety sod must be placed. If no grass existed prior to construction, the sod shall be "Maryland State Approved" General Purpose Turf Sod unless otherwise specified by the Engineer:

"MARYLAND STATE APPROVED" GENERAL PURPOSE TURF SOD

Kentucky Bluegrass
  15-40% Merion
  15-40% Kenblue or South Dakota Certified
  0-35% Fylking or Pennstar

Creeping Red Fescue
  20-50% Pennlawn or Jamestown

Sod shall be machine cut at a uniform thickness of 3/4 inch, plus or minus ½ inch; measurement shall exclude top growth and thatch. Sod shall be of standard width and length and shall be strong enough to support its own weight. Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival. It shall be harvested, delivered and installed within a period of 36 hours. Sod shall be laid in a straight line with rows placed parallel to and tightly against each other. Lateral joints shall be butted tight in order to prevent voids which may cause air drying of the roots.

Sodding may be performed any time the ground is not frozen before December 1, or after February 15. On areas with greater than 2:1 slope, or where erosion may be a problem, sod shall be secured by wire staples or wood pegs. As sodding is completed in any one section, the sodded area shall be rolled or tamped. It shall then be thoroughly irrigated to a depth sufficient that the underside of the new sod pad and soil immediately below the sod is thoroughly wet. The contractor shall be responsible for maintaining (including watering and cutting) the sodded area until the sod has set firmly, is in a growing condition, and final acceptance is given by the Engineer.

Unless a specific item for the payment of sodding is included in the proposal form, the cost of such sodding shall be included in the unit prices bid for excavation and backfill.

If at any time during the course of the work the restoration operation or the conservation practices in any given area should become delinquent in the opinion of the Engineer, he may order the work of pipe laying be stopped until such delinquent condition(s) is rectified. The Contractor shall not be entitled to any additional compensation or extension of time of completion should any such stoppage of pipe laying be ordered by the Engineer.due to delinquent restoration or faulty conservation practices on the part of the Contractor.

If pipe laying has been completed and, in the opinion of the Engineer, the Contractor is delinquent in his restoration, the provisions of Section 1-11 of the General Specifications (Disqualifications of Bidders) shall pertain and remain in force until such time as the Contractor's name is removed from the "cleanup" list. A delinquent Contractor shall be placed on the "cleanup" list until the restoration requirements are completely satisfied. No other proposals shall be accepted from a delinquent Contractor so long as that Contractor remains on the "cleanup" list.

Where rights of way cross roads, formerly inaccessible areas become accessible to the public for dumping refuse. To prevent this type of pollution, a low profile rustic fence built across the right of way and equipped with a gate may be specified prior to bid or by a later modification to the contract. In cases involving contract modification, the Engineer shall determine the appropriate barrier which may include the erection of said fence and/or additional tree and shrubbery plantings. Based on this determination, the Engineer will solicit the property owner's approval in writing prior to Contract modification.

Should the Contractor have to reenter the right of way after restoration, and before final acceptance, in order to correct any deficiencies, it shall be the Contractors responsibility to correct any damages to the restoration caused as a result of his reentering the right of way.

The Special Provisions set forth in any contract with the WSSC shall supersede or modify the requirements and standards presented herein.

IV. Maryland-National Capital Park and Planning Commission.

The Commission will send a copy of the plan of proposed work through Park property to the MNCP&PC and will notify them when the work is to start. Construction methods within this property shall conform to the requirements of the Park and Planning Commission, which are in general as follows:

There shall be a "clearing strip" not to exceed 20 feet in width being ten feet on each side along and adjacent to the centerline of the main, and "construction strips" of 10-foot width on each side of the "clearing strip." All work shall be confined strictly within this 40-foot strip unless permission to the contrary has been granted in writing by the Park and Planning Commission.

Within the clearing strip, all trees and other vegetation may be removed except trees marked with yellow, orange, or white paint by the Park and Planning Commission and any other trees designated for preservation on the plans. In addition all dogwoods shall be transplanted by the Contractor as directed by the Park and Planning Commission in advance of construction. Within the construction strips, no trees may be cut unless written permission is obtained by the Contractor from the

Park and Planning Commission and placed on file with the Engineer.

Adequate boards or guards shall be placed around designated trees to protect roots and trunk.

Roots two (2) inches or greater in diameter of designated trees shall not be cut unless written permission for same is obtained from the Park and Planning Commission and placed on file with the Engineer.

Wherever the Park and Planning Commission shall designate, trees shall be tunneled, so as to disturb the roots to the minimum extent. The backfill around the roots shall be of suitable soil, carefully tamped into place to eliminate Air pockets. Such backfilling is to be done immediately after the pipe has been laid and accepted, so as not to expose roots to weather any longer than necessary.

All trees barked or scarred during construction shall receive prompt temporary repairs. Final repairs including painting shall be made by an experienced tree surgeon and suitable to the Park and Planning Commission.

Any cut trees selected by the Park and Planning Commission shall be trimmed, cut into selected lengths, and stored at designated points or removed from Park and Planning Commission property as determined by the Park and Planning Commission Engineer.

Topsoil shall be removed from the clearing strip area, stockpiled and replaced after completion of work.

All debris, including trees, stumps, branches, brush, papers, boxes, bricks, gravel, extra and rejected joints of pipe, and other waste, shall be burned if permitted by the Park and Planning Commission, or removed from the park area. If waste materials are to be burned on location, the site and time of such burning shall be selected, subject to approval of the Park and Planning Commission, to insure minimum damage to park flora and fauna.

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Any disturbed, damaged, or destroyed park property, including designated trees or groups thereof, shall be replaced or restored to a condition satisfactory to the Park and Planning Commission.

The cleaning up and restoration of the park area shall proceed along with the construction. There shall be a limit of thirty (30) days following the completion of the job for final cleaning and restoration of park property as near as possible to its original condition.

All areas disturbed by the construction or any related operations shall be seeded and mulched unless otherwise specified. Topsoil shall be placed at a minimum depth of four (4) inches in areas to be seeded.

All areas seeded shall if necessary be watered, cut and seeded until said areas are covered with a substantial crop of live grass and until final acceptance by the Park and Planning Commission.

At points where the trench cuts into a creek bank or where the creek bank is built up new with backfill, such points shall be rip-rapped in accordance with the Washington Suburban Sanitary Commission's Standard Detail and General Specifications unless otherwise specified by the Park and Planning Commission.

All rock removed in excavating shall be used at areas along the creek bank so designated by the Park and Planning Commission. Excess rock beyond that in rip-rapping shall be neatly disposed of in the vicinity of the excavation at places so designated by the Park and Planning Commission, or removed from Park property.

Storing of equipment, materials and machinery shall be in the area or areas designated for that purpose by the Park and Planning Commission.

The conditions set forth in any permit issued by the Maryland-National Capital Park and Planning Commission shall supersede anything mentioned in this section. Anything not covered by the special conditions of the permit or by this subsection shall conform with the General Specifications applicable to private property (see I, II, and III, this section).

V. Maryland and National Park Services. Any construction projects undertaken on property administered by either Park Service will be done in accordance with special conditions set forth in permits to be issued by the agency. Anything not covered by the special conditions of the permit or by this subsection shall be in full accord with the requirements and standards of the General Specifications applicable to private property (see I, II, III, this section). A representative of the Park Service will inspect the project and approve all restoration prior to final acceptance by the Engineer.

VI. Other Public Areas.

A. Along Traveled Roads

Wherever in this section the word "Roads" is used, it shall also pertain to streets where applicable.

It is necessary that every precaution shall be taken to insure the safety and to provide for the uninterrupted travel of the public using the roads and sidewalks.

Unless the Engineer shall authorize the complete closing of a road, the following provisions shall be enforced:

On secondary roads, earth excavation from the trenches may be deposited on the road but in such a manner that not more than one-half of the road is so occupied and so that at least one-way traffic, unless otherwise specified by the County Permit, is maintained during working hours. At the close of work each day, the area of the work shall be cleaned up and shall be confined to the smallest area possible so that maximum use of the road will be restored and the hazard to traffic be reduced to the minimum; on primary roads, earth excavation from the trenches shall not be deposited on the road unless permission for such has been received from the Engineer. At the close of work each day, no excavation shall remain open without the approval of the Engineer, except when the excavation can be safely bridged with the use of steel plates or other accepted materials. The area shall be cleaned up and no obstacles sha remain in the road.

At all times during the progress of the work when the road may be blocked to any extent by construction equipment or operations, special workmen, equipped with

with red flags at least 18" square or signal paddles, shall be designated by the Contractor to direct traffic. Red or orange safety garments shall be worn by all flagmen. During periods of darkness, red lights and reflectorized safety garments shall be used. Special workmen engaged in directing traffic shall not be assigned to any other duties.

Sidewalks and crossings shall be left open for the passage of pedestrians, unless otherwise authorized. When the excavation remains open for any extended period, the Contractor shall construct and maintain, without extra compensation, such adequate and proper bridges over excavations as may be necessary or directed for the purpose of accomodating pedestrians.

Driveways to properties shall be kept open at all times except when pipe laying beneath them is in actual progress.

At all times the Contractor shall use necessary men and traffic control signs and devices required by the specifications of the Maryland State Roads Commission's manual of "Traffic Controls for Highway Construction and Maintenance Operations, October 1962" or latest revisions thereto.

It is essential that the Contractor realize his responsibility for the safety of traffic on roads and pedestrians on sidewalks and any additional precautions necessary, in addition to those prescribed above.

Wherever shoulders have been disturbed the shoulders shall be restored to at least their original condition. Where an excavation has been made in a shoulder, the excavated material may be used for the replacement of the shoulder, only if the shoulder material has been previously segregated. Any shoulder material, excavated or existing, that has been contaminated by foreign material shall be replaced with new material of the same quality and gradation. Grading and stabilizing of the shoulder shall be in accordance with the requirements of the road agency.

When the area adjacent to the road is not a traveled shoulder, curb and gutter, or grass lawn, and this area is disturbed so that it is unstable and will be a hazard to the public, the area shall be surfaced with a stabilized gravel or blue stone shoulder.

All gravelled or blue stone surface roads shall be restored in the same manner prescribed for restoring gravelled shoulders.

No undercutting of roads will be permitted unless approved by the Engineer. If tunneling of public roads is required, it shall be the responsibility of the Commission to obtain permission from the applicable jurisdiction.

The Contractor shall carry on his operations in conformity with these requirements, without additional compensation over the prices bid for the work.

B. In Vicinity of Trees

In public areas such as roads and streets, the Maryland Forest Service, in general, has control over trees and in such areas the Contractor shall carry on his operations in conformity with the requirements of that agency at no additional compensation over the price bid for the work. Wherever there are trees, in the public way in the vicinity of the proposed construction, a "Maryland Forest Service Tree Permit" will be issued by the representative of the Maryland Forest Service. A copy of this permit will be on file in the office of Environmental Matters and may be examined by anyone concerned.

The work in the vicinity of these trees shall be performed in strict accordance with the provisions of this permit and all costs involved in doing so shall be included in the prices bid for other work under the contract.

The Contractor shall have no claim for extra compensation due to any excavation or other protective measures required in the vicinity of trees that must be left standing.

All cut timber and brush shall be removed from the site of the work unless otherwise directed in the permit.

The Contractor shall exercise due care not to injure trees, other than those he is permitted to cut down, within or adjacent to the line of trenches, either on private or public property or those under the jurisdiction of the State Forest Service. He shall be held liable for trees damaged or destroyed by his activities.

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**PRINCE
GEORGE'S
COUNTY**

**Courthouse.
Upper Marlboro. Maryland 20870
(301) 627-3000**

County Council
FRANCIS B. FRANCOIS
Chairman

AUG 2 1974

Mr. Daniel J. Snyder, III
Acting Regional Director
Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

On Tuesday, July 30, the County Council, by a 7-3 vote, adopted Council Resolution 81 embodying a so-called "balanced system" of sludge use/disposal that places emphasis upon land application methods.

As the Sanitary Commission's studies related to sludge management alternatives cited in the resolution are completed and evaluated, it is likely that the policy will be modified accordingly.

The policy statement reaffirms the Council's action on May 28 with respect to the testing of incinerators at Piscataway Treatment Plant and requests the Sanitary Commission to pursue the "heat treatment" alternative to incineration at Western Branch.

With regard to the Parkway Treatment Plant incinerator, the resolution specifically permits the Sanitary Commission, subject to certain conditions, to proceed with the "shakedown" phase of the incinerator project, stack emission testing by Battelle Columbus Laboratories, and related air quality testing within the vicinity of the treatment plant.

It was the view of a Council majority that the incineration option must be preserved at least until the WSSC completes its investigation of other alternatives and the county has gained some experience with raw sludge trenching, which to date has been carried out on only a very limited scale. As adopted, the "balanced system" concept identifies for incineration, a possible future role as back-up system to be utilized in the event that land application methods fail.

It is anticipated that the County Council, in recognition of its legally binding obligations under the Blue Plains Regional Treatment Plant Agreement, will shortly select a site for raw sludge trenching and, thus, will gain experience in this method of disposal in the

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coming months. Likewise, it is anticipated that the Sanitary Commission will complete the study of the various alternatives cited in CR-81 sometime this fall, a timeframe which should coincide roughly with the Parkway incinerator testing program.

In the meantime, we have been informed that the county's Sludge Utilization Study Group will be submitting guidelines for the land application of sludge as envisioned in the "balanced system" approach.

The management of sludge produced by the Blue Plains Treatment Plant, a portion of which Prince George's County must accept for disposal, and the several treatment plants situated within the county is one of the most difficult problems facing the County Government and the Sanitary Commission. While Council Resolution 81 should not be viewed as the final word, it addresses the problem in a comprehensive fashion for the interim period, until the situation clarifies in the coming months with regard to raw sludge trenching and other incineration alternatives.

Sincerely,

Francis B. Francois
Chairman
County Council

cc: Mr. Bill Colony
Mr. Daniel Geller
Mr. Thomas S. McKewen

COUNTY COUNCIL OF PRINCE GEORGE'S COUNTY MARYLAND

Legislative Session 1974
Presented by Councilmen Francois, Spellman and White
Introduced by Councilmen Francois, Spellman and White
Resolution No. CR-81-1974
Introduced by Council on July 23, 1974

A RESOLUTION

WHEREAS, The County Council for Prince George's County, Maryland, on May 28, 1974, endorsed in concept a "balanced system" approach to the use and/or disposal of digested and undigested sewage sludge; and

WHEREAS, The "balanced system" concept is described in a March 27, 1974 letter authored by Dr. John Walker, soils scientist at the Agricultural Research Center in Beltsville, said letter being attached hereto and incorporated herein; and

WHEREAS, The "balanced system" concept emphasizes the land application of sludge, whereby nutrients from human waste can be beneficially returned to the environment, while at the same time identifying for sludge incinerators now under construction a role as a back-up system to land application methods; and

WHEREAS, The County Council, sitting as the Board of Health, believes that it is necessary and desirable to have a back-up system available for use when weather conditions seriously impede land application, or in the event that such unperfected land disposal systems as undigested sludge trenching (for which there has been no sustained experience in Prince George's County or elsewhere in the region) fail for whatever reason; and

WHEREAS, The County Council on May 28 also declared a policy that the incinerator at Piscataway Sewage Treatment Plant should not be permitted to operate until (1) thirty calendar days after the final Environmental Impact Statement has been approved by the Council of Environmental Quality, (2) standards have been set for pollutants from the incinerator, and (3) it has been proved conclusively that these standards in that particular topography will not cause any health hazard to the families living in the area; and

WHEREAS, The County Council was greatly influenced in adopting said policy for Piscataway Treatment Plant by the plant's topographical setting in a box canyon and with homes situated on hills to the north, east and south -- characteristics peculiar to the Piscataway plant location; and

WHEREAS, In response to the Council's concern and a specific request from the Environmental Protection Agency for a sludge handling contingency plan, the Washington Suburban Sanitary Commission transmitted to EPA on June 20, 1974, a contingency plan reflecting that studies of the following alternatives were underway:

1. Anaerobic Digestion - A thoroughly demonstrated and accepted process for reducing the volatile content of sewage sludge and simultaneously reducing odors and pathogenic bacteria, this system has a high capital cost and would require two to three years to implement;

2. Aerobic Digestion - A process which has demonstrated the capability to reduce the volatile content and pathogens of raw sludge in plants of relatively small capacity, aerobic digestion of primary sludge is comparatively inefficient and has a high capital cost;

3. Chlorine Oxidation - A commercial process using chlorine for chemical stabilization, it kills pathogenic organisms, eliminates odors and produces a stable sludge. Since it kills the bacteria needed for the composting process, it is not expected to be suitable for this process. The Agricultural Research Service is currently investigating its suitability for land application. This system is expected to have a lower capital cost and a higher operating cost;

4. Pure Oxygen Digestion - While it has been demonstrated at several plants, the process is still under development. Capital cost would be high, and so would the operating costs;

5. Lime Stabilization - Currently not fully developed, this process would produce a chemically stabilized sludge. Capital and operating costs would be relatively low;

6. Composting - The composting of raw sludge, which so far has produced serious odor problems, is still under development by the Agricultural Research Service;

7. Flash Drying - This process is currently being tested at the Blue Plains Treatment Plant and, if successful, will produce a marketable end product. Capital and operating costs are high, but may be offset if the sludge can be sold.

WHEREAS, While there is hope that one or more of these "contingency plan" alternatives will prove feasible upon completion of the studies now underway, sufficient information is not presently available to justify a selection of any at this time; and

WHEREAS, Any sludge management policy, therefore, must take into account the possibility that raw sludge will be produced at the permanent sewage treatment plants located in Prince George's County; and

WHEREAS, In virtually the same time frame required for the completion of the WSSC's studies of potential alternatives described in its contingency plan, Prince George's and Montgomery Counties and the Maryland Environmental Service - by virtue of their participation as signatories in the regional Blue Plains Treatment Plant agreement - are expected to gain experience in raw sludge trenching over a sustained period in the coming months, hopefully eliminating many of the uncertainties related to this particular land disposal method; and

THEREFORE, BE IT RESOLVED, That the County Council for Prince George's County, Maryland - pending the results of the studies of sludge handling alternatives by the WSSC and future County Council decisions related thereto, and also subject to future operating experience with undigested sludge trenching - hereby formally adopts the seven-point "balanced system" concept for the use and/or disposal of digested and undigested sludge, with the understanding that land application methods are deemed at this time to be more environmentally sound and, thus, comprise the preferred method of sludge management, but that the option of utilizing sludge incineration as a back-up system must be preserved for implementation, provided that the director of the Prince George's County Health Department certifies to the County Council that such operation will not be injurious to the public health and safety, in the event that land disposal operations fail for whatever reasons, and, thereby, pose a danger or serious odor nuisance to citizens of the County; and

BE IT FURTHER RESOLVED, that the County Council urges the County's Sludge Utilization Study Group to expedite the preparation of guidelines for each of the methods described in the "balanced system," and declares the following additional interim policies with respect to the County's permanent sewage treatment plants:

Piscataway

The policy enunciated in Council Resolution 51 will remain in effect until conditions 1, 2 and 3 stated therein have been met to the satisfaction of the County Council.

Western Branch

Given the fact that the "heat treatment" alternative to incineration was initially incorporated into the design of this plant's sludge handling capability; since the completion of the heat treatment facility, according to the WSSC's estimates, will be in phase with the July 1975 date for completion of the plant enlargement; and in recognition of the above stated preference for processes and methods which make possible the beneficial re-use of sewage treatment residues, the WSSC is requested to abandon its present plan for sludge incineration at the Western Branch Sewage Treatment Plant.

Parkway

Consistent with the goals, policies and objectives stated in Council Resolution 19, which prescribes a formula for the allocation of sewage treatment capacity, the County Council finds that it is essential that the enlarged Parkway Sewage Treatment Plant be placed into operation by no later than January 1, 1975.

In the interest of the community's health, safety and welfare, the WSSC and the State Department of Health and Mental Hygiene are urged to expedite the placing of the plant enlargement on line so as to eliminate the present discharges of substandard effluent into the Patuxent River and to permit, as contemplated in Council Resolution 19-1974, authorization of sewer service for the Greater Laurel Area Hospital - a much needed community health facility.

If the Parkway Incinerator is required to be utilized to carry out a "balanced system" sludge disposal approach and as a backup measure, the County Council finds that the following conditions are to be attached to any use thereof:

1. Prior establishment of ambient air monitoring stations throughout the Parkway area by the WSSC, in cooperation with the Health Officer, with daily sampling required. Further, if air samples indicate excessive pollutant loadings on any given day, in the judgment of the Health Officer, the burning of sludge will be halted immediately and will not be resumed until the Health Officer has determined that it is appropriate to do so.

2. That on or near October 15, 1974, the County Council schedule, and duly advertise, a public review of the test results of the air quality, the stack emissions, and soil conditions and, thereafter, periodic public reviews scheduled by the County Council, and duly advertised, at intervals of not less than six (6) months nor more than twelve (12) months to review the environmental ambient conditions.

3. In deference to the community's health, safety, and welfare, the County Council hereby declares the policy that there shall be no importation of sludge from any other treatment plant

in Maryland or any other jurisdiction to the Parkway Treatment Plant for other than the initial limited test purposes.

It is recognized that topographical conditions at Parkway are quite different from Piscataway. Nevertheless, the County Council believes this cautious approach to the Parkway Incinerator use is required.

Adopted this 30th day of July, 1974.

COUNTY COUNCIL OF PRINCE
GEORGE'S COUNTY, MARYLAND

BY:
Francis B. Francois
Chairman

ATTEST:

Jean M. Schmuhl, Clerk

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
NORTHEASTERN REGION
AGRICULTURAL RESEARCH CENTER
BELTSVILLE, MARYLAND 20705

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P.G. COUNTY COUNCIL

March 27, 1974

Mr. Kenneth V. Duncan
County Admin. Officer-Council
Prince Georges County Courthouse
Upper Marlboro, Md. 20870

Dear Ken:

At the meeting on March 21 the possibility of using a balanced system for using (disposing) of sewage sludge on land was discussed as an alternative method for disposing of the Piscataway Wastewater Treatment Plant sludge.

I believe that a balanced system can be utilized now for land application of sewage sludge as an alternative means of sludge disposal. A balanced system would entail:

1. When the weather permits, land application of digested sludge on farmland at fertilizer rates (see draft guidelines of University of Maryland - Maryland State Department of Health).
2. When the weather permits, land application of digested sludge on marginal land at fertilizer-soil conditioner rates (see draft guidelines of University of Maryland - Maryland State Department of Health).
3. If all sludge at Piscataway cannot be digested, place the sludge in marginal land in trenches 2 ft. deep x 2 ft wide x 2 ft. apart edge to edge (See draft guidelines of University of Maryland - Maryland State Department of Health and we have a summary report on trenching). Trenching can be nearly an all-weather operation if proper equipment and techniques are used.
4. While we would hope that sludge would not be routinely landfilled because of its significant value as a soil building resource, landfilling is an important alternative to land use when procedures 1, 2, 3, 5, 6, and 7 are unavailable due to poor weather conditions for land spreading or as yet not completely developed techniques or for other reasons. Digested and raw sludge from Northern Virginia is successfully landfilled at Lorton, Virginia by mixing one part sludge with 10 parts refuse. This does not take excessive space and actually packs well.

5. Composting of digested sludge with minimal objectionable odor prior to its use on land is a very workable alternative. It makes a safer and easier to use soil building resource than is incomposted sludge. Sludge cannot adequately be accepted for composting on days it is raining at the present time. This may change when cover is provided for on part of the composting pad and/or cover is provided for the bulking materials. Techniques for composting raw sludge with minimal objectionable odor are under development. Blending raw and digested sludge together prior to composting may be a solution.

6. Drying sludges such as is being done in Chicago and Milwaukee and currently being developed at Blue Plains may be usable alternatives as procedures for sludge processing prior to use on land, when they become fully developed.

7. Incineration can also be used as a backup to landfilling when utilization procedures are not possible due to weather or for other reasons.

These thoughts may be of help to you. Please do not hesitate to contact us if we can be of further assistance.

Sincerely,

John

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John M. Walker
Soil Scientist
Biological Waste Management Lab.
AEQI

CC: Perry Stearns